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Managing Water in the West

Environmental Assessment for the Laguna Reservoir Restoration Project

Laguna Restoration Project
Lower Colorado Region

U.S. Department of the Interior
Bureau of Reclamation
Yuma Area Office
Yuma, Arizona

April 2006

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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Lower Colorado Region

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1.0 Purpose and Need

1.1 Introduction

This Environmental Assessment (EA) has been prepared by the Bureau of Reclamation (Reclamation) in accordance with the National Environmental Policy Act (NEPA) (42 United States Code [USC] Section 4321 to Section 4347) and the Council on Environmental Quality (CEQ) NEPA Regulations (42 USC 4371 et seq.). The proposed Laguna Reservoir Restoration Project (Project) is intended to restore the storage capacity of the Laguna Reservoir on the Colorado River to allow the capture of sluicing flows from Imperial Dam. Reclamation manages multiple facilities along the Colorado River to control floods, deliver water for beneficial uses in the United States (U.S.) and Mexico, and generate electrical energy.

Laguna Reservoir's storage capacity prior to 1983 was maintained at approximately 1,500 acre-feet (af), but flood-deposited sediment has reduced the storage capacity to approximately 400 af. The Project is designed to restore the reservoir's capacity to 1,500 af through the excavation of accumulated sediments in the basin area immediately upstream of Laguna Dam.

The purposes of the EA are to:

- Disclose to decision-makers and the public the Project's potential environmental effects;
- Identify ways to avoid or reduce potential adverse effects through alternatives or mitigation measures; and
- Enhance agency coordination and public participation in the project review process.

Reclamation is the lead agency for the EA. Other agencies that may use the EA or information contained in the EA in approving various aspects of the Project are discussed in Chapter 5.

1.2 Project Location

Laguna Dam is located approximately 12 miles northeast of Yuma, Arizona, and five miles downstream from Imperial Dam, on the border of California and Arizona (Figure 1-1). The reservoir storage area is located within the existing floodplain of the Colorado River that is currently bound by Imperial Dam on the north side, Laguna Dam on the south side, Mittry Lake and the Old River Channel on the east side, and the Laguna Settling Basin on the west side (Figure 1-2).

1.3 Background

Laguna Dam, completed by Reclamation in 1909, is a rock-filled dam with a structural height of 19 feet and a length of 4,840 feet (dam and weir). It was originally built to create a diversion structure and desilting works for the old Yuma Main Canal on the California side of the river and the North Gila Canal on the Arizona side of the river. In 1948, the outlet works for the Yuma Main Canal were sealed and water for the Yuma Project was diverted through the All-American Canal at Imperial Dam, built in 1938 and located about 5 miles upstream from Laguna Dam. In 1953, the outlet works for the North Gila Canal were sealed and diversions to the North Gila Valley began through the Gila Gravity Main Canal, which also diverts at Imperial Dam. Laguna Reservoir's original storage capacity was approximately 1,500 af and was historically maintained by dredging approximately every ten years (since the 1940s) to prevent sediment accumulation. Sediment deposition has reduced the reservoir storage capacity to approximately 400 af at the present time (see Figure 1-3 for views of the Laguna Reservoir over time).

1.4 Purpose and Need for Proposed Action

The purpose of the proposed dredging project above Laguna Dam is to provide increased water storage capacity to capture sluicing flows released from Imperial Dam and to maintain the operational integrity (function ability) of Laguna Dam. The current reduced storage capacity within the Laguna Reservoir is insufficient to accommodate regular sluicing events which require releases of approximately 300 to 400 af of water per event and should occur two to three times per week. Sediment collected by the Imperial desilting works, along with water to move it, is discharged into the California Sluiceway. As sediment collects in the sluiceway, it is moved 3,000 feet downstream to a sediment settling basin in Laguna Reservoir using high rate, short duration sluicing flows of 8,000 to 14,000 cubic feet per second (cfs) of approximately 20 minutes in duration. The current frequency of sluicing events performed approximately every other week has resulted in accumulated sediment above Laguna Dam which would require increasing amounts of water over time to remove sediment and prevent compaction.

In addition to affecting the ability to store sluicing flows, sediment deposition above Laguna Dam has resulted in nuisance vegetation growth near hydraulic features, which compromise the operational function of the reservoir and the structural integrity of the Dam, including features of historical value. Laguna Dam is used as a regulating structure for Laguna Reservoir. Vegetation growth and silt capture upstream of Laguna Dam gate structure's concrete outlet channel (outlet structure) located at the California side of Laguna Dam (Figure 1-2) has blocked about two thirds of the channel. Woody vegetation has also grown across a significant portion of the Laguna Dam weir. Vegetation upstream of the weir adversely affects the structural integrity (accelerating structural deterioration) of the weir and causes the water surface elevation to rise further above the design water surface elevation during floods, creating a larger impoundment and thus inundating a larger area than would otherwise occur. If vegetation continues to grow across the remaining open section of the outlet structure, it would completely block flows from entering the outlet structure when the reservoir rises during a 50 to 100 year flooding event, further increasing the water surface elevation upstream of Laguna Dam.

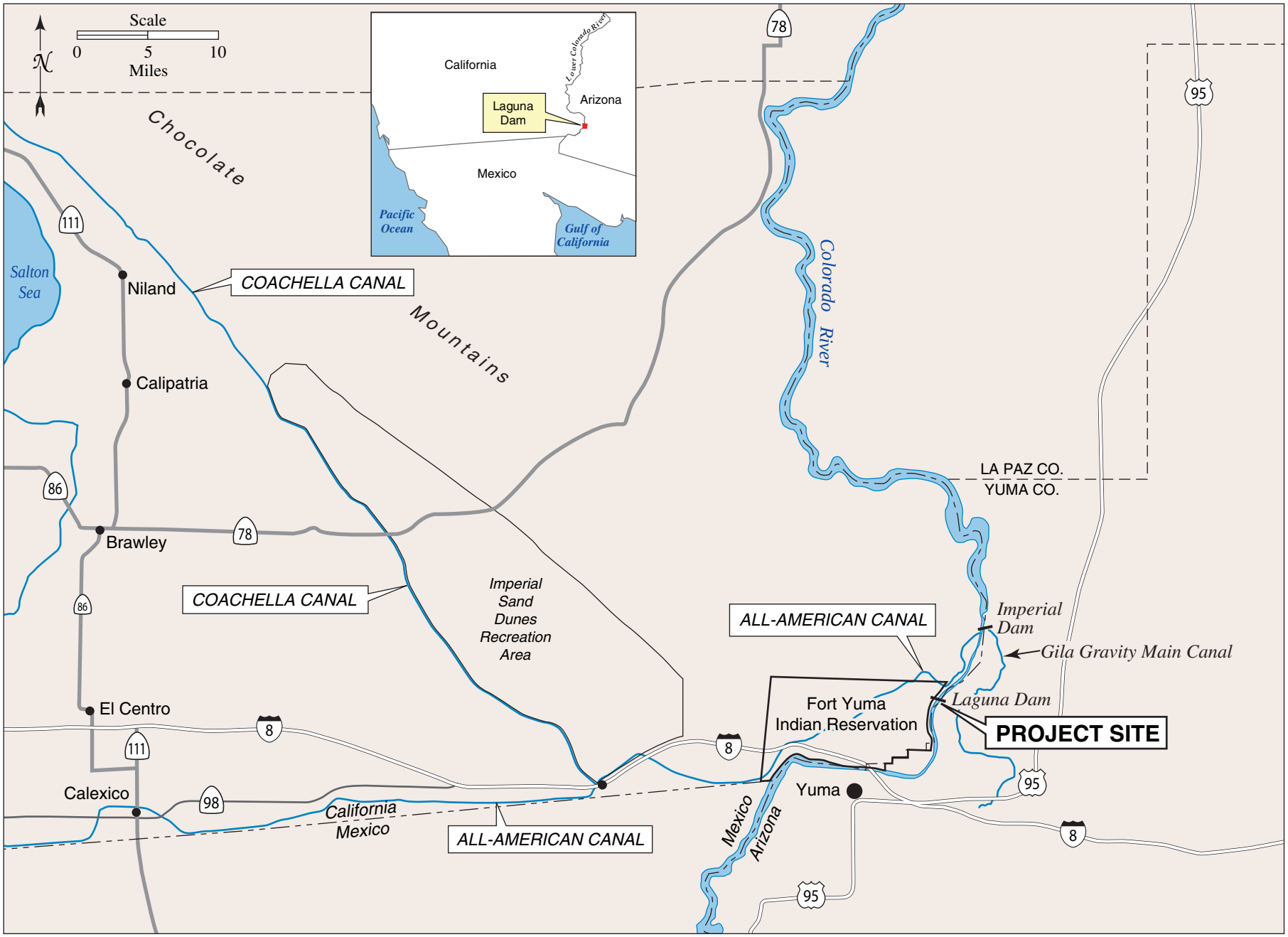


Figure 1-1. General Location of the Laguna Reservoir Restoration Project

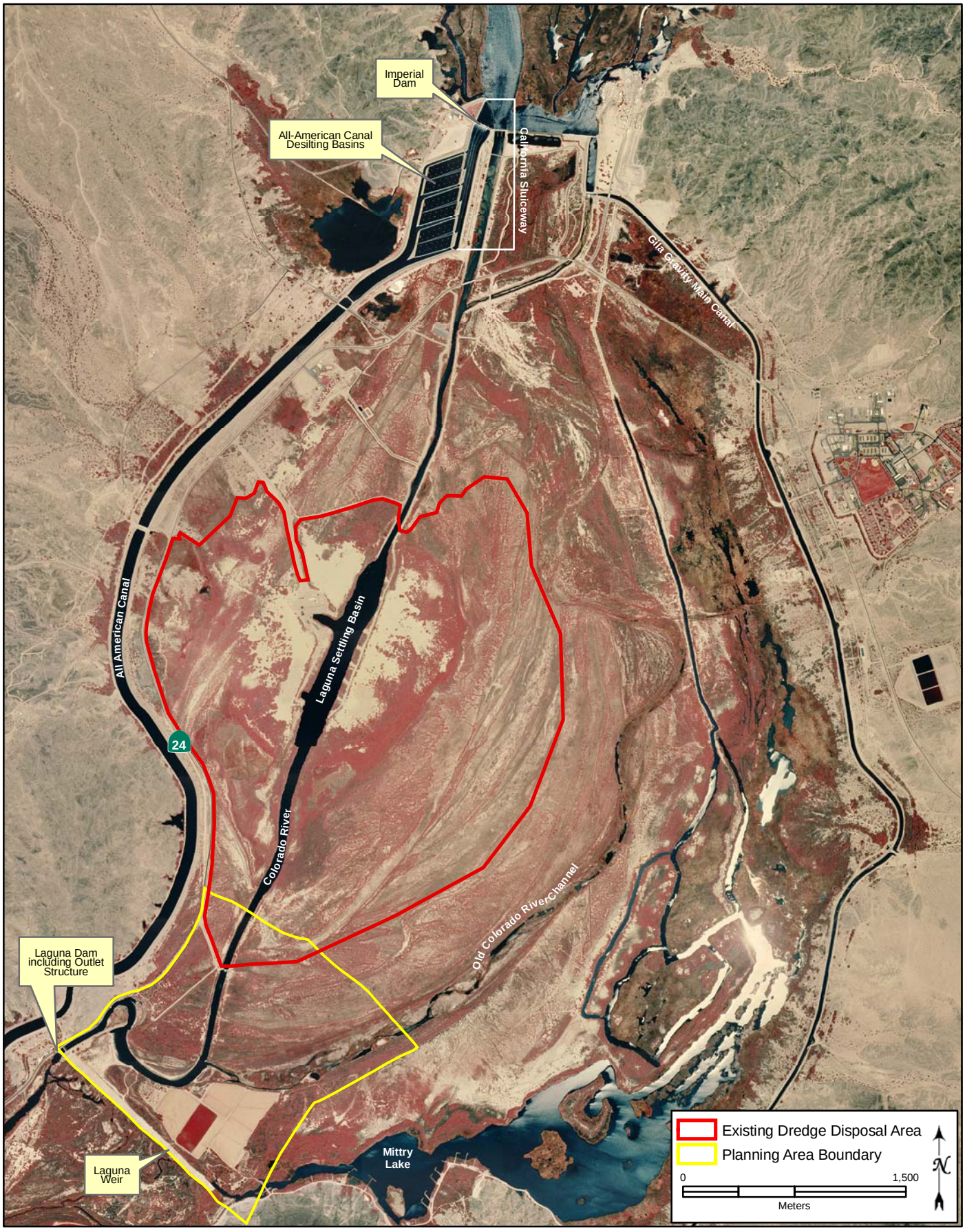
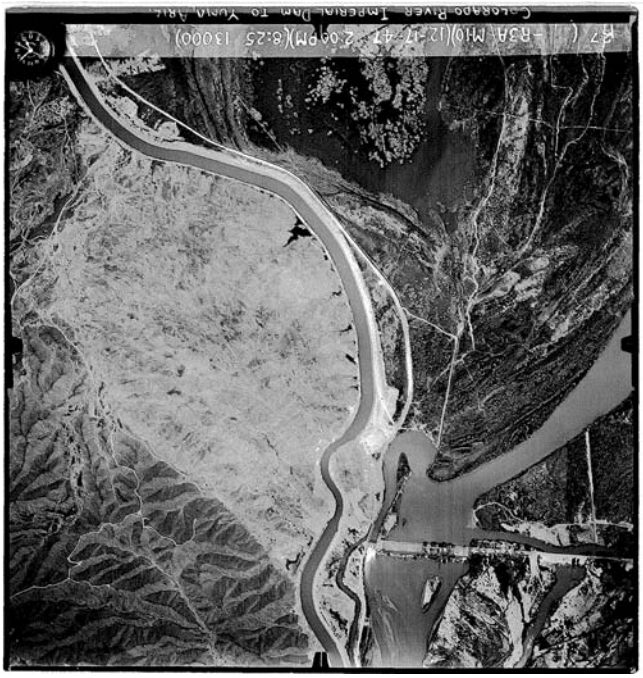
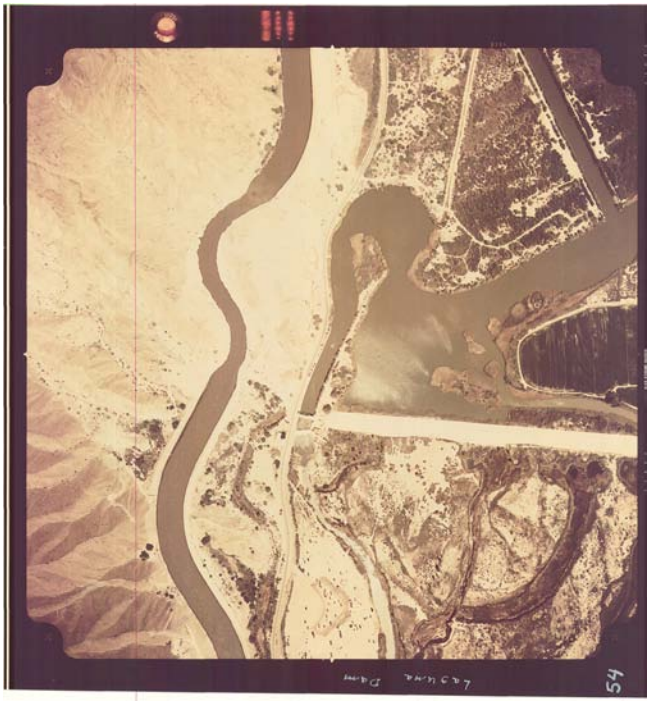


Figure 1-2. Locator Map



Air photo dated December 17, 1947.



Air photo dated October 1979
(showing pre-1983 conditions).

Photograph taken November 2005.

Figure 1-3. Views of Laguna Reservoir over Time

1.5 Public Involvement and Scoping Process

Reclamation conducted scoping to provide interested individuals and organizations information about the project and opportunities to comment on the proposed action, alternatives, and potential issues. Details about the scoping process, comments received, and Reclamation responses are provided in Appendix A. Reclamation's coordination with resource agencies is on-going and will continue throughout the proposed project.

1.6 EA Organization

The Project (the Proposed Action) and alternatives considered as part of the NEPA process are described in detail in Chapter 2. Chapter 3 presents information on the affected environment; environmental impacts associated with implementation of the Project; and mitigation measures designed to avoid or substantially reduce potentially adverse environmental effects. Chapter 4 describes the cumulative impacts of the Project when combined with impacts of other past, present, and reasonably foreseeable future actions. Chapter 5 addresses other NEPA considerations, including compliance with environmental statutes, possible conflicts with land use plans, and the relationship between short-term uses of the environment and long-term productivity. Chapter 6 identifies preparers of the EA, and Chapter 7 contains a list of the persons and agencies consulted during preparation of the EA. Chapter 8 provides the list of those entities that will receive a copy of the Draft EA for review. Chapter 9 provides the reference list for the EA, and Chapter 10 identifies the acronyms used in the document.

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2.0 Alternatives Including the Proposed Action

2.1 Alternative 1 — 1,500 Acre-Feet Storage Reservoir with Reduced Wetland Impact (Proposed Action)

Under Alternative 1 (Proposed Action), Reclamation would increase storage behind Laguna Dam from approximately 400 af to 1,500 af by removing accumulated sediment through dredging behind Laguna Dam and weir, in the existing river channel, and in uplands, as shown in Figure 2-1. The dredging plan was designed to avoid as much of the existing wetlands as is practicable, while meeting the purpose and need for the project.

Location of Proposed Dredging and Vegetation Removal Activities

Proposed sediment and vegetation removal would restore the operational effectiveness of existing structures, including the gated outlet structure and the weir. Under the Proposed Action, Reclamation would remove sediment and vegetation in the following areas (Figure 2-1):

- Remove approximately 1.4 acres of vegetation and sediment of the island at the entrance to the outlet structure (Area A) that currently restricts flows through the outlet structure. The majority of the island would be left intact to minimize impacts to the associated wetland area. The dredge cut would be approximately 10 feet deep.
- Dredge approximately 27 acres behind the dam and weir (Area B). The dredge cut would be approximately 10 feet deep. Dredging directly behind the dam would include a 50-foot buffer area from dam crest to dredge to ensure that no dam feature would be inadvertently impacted during dredging operations.
- Dredge 88 acres of upland area (Areas C and D). The dredge cut would be approximately 12.5 feet deep. The design for the upland dredging areas includes at least a three foot horizontal to one foot vertical slope (3:1 slope) for any new bankline cuts.
- Dredge approximately 34 acres within the existing open water channel (Area E). The approximate dredge cut would be 2.5 feet deep.

The total dredging volume for all areas would be approximately 2.3 million cubic yards of material. Dredging and vegetation removal activities would result in the removal of approximately 7.2 acres of existing wetlands. While this alternative includes some dredging at the mouth of the Old River channel impacts on wetlands in the Old River channel would be avoided by restricting the dredging activity to the open water areas only. Avoidance of wetland areas along the Colorado River channel and the weir would be accomplished by creating a buffer zone between the dredging operation and the wetland vegetation equaling three times the depth

of dredging cut. For example, if the depth of cut is 10 feet, the distance between the dredge and wetland vegetation would be 30 feet.

Table 2-1. Comparison of Dredging Areas among the Project Alternatives (acres)

Dredging Area	*Alternative 1 (Proposed Action)*	*Alternative 2*	*Alternative 3*	*No-Action Alternative*
A	1.4	3.5	4.0	0
B	27	29.5	25.5	0
C & D	88	212.3	84.6	0
E	34	34.8	34.0	0
Total Acreage Dredged	150	279.4	148.1	0

Vegetation Removal and Dredge Operations

Prior to dredging, Reclamation would clear and mulch vegetation using land-based equipment, and an amphibious mower and/or excavator would be used in inundated areas to clear a path for the dredge. A floating dredge with cutter head would be used to loosen sediment, and the sediment would then be blended with water and pumped through a temporary hydraulic pipeline to the disposal site (Figure 2-1). The pipeline from the water's edge to the disposal site would be placed adjacent to, or on, an existing service road leading to the disposal site where it is moved by equipment in the filling and spreading process. The total length of the pipeline would be approximately 1.5 miles.

During dredging, excavation depth would vary depending on the existing overburden. The bottom of the proposed excavated areas would be approximately 141 feet elevation and the maximum water depth would be about 10 feet. Dredging operations and vegetation clearing are expected to occur over a 36-month period, between July 2006 and June 2009. For a comparison of acreage dredged by area see Table 2-1.

Dredge Staging and Launching

The proposed dredge launch site is located on Security Zone lands (lands withdrawn by Reclamation) within the boundary of the Fort Yuma Indian Reservation (Figure 2-1). An existing boat ramp located at the site (see Figure 2-1) would be modified and expanded. The resulting launch ramp would measure 200 feet by 200 feet. Modification and expansion of the launch site would require vegetation clearing and grading of the area around the existing boat ramp and placing approximately 25 cubic yards of gravel material below the Ordinary High Water Mark. An additional area adjacent to the boat ramp (200 feet by 200 feet) would be cleared and set up as a staging and storage area for dredging operations. Existing access roads would be re-graded to support construction vehicles. Reclamation is also considering an alternative dredge launch site located on the Arizona side of the river (see Figure 2-1), which would need the same upgrades as described above.

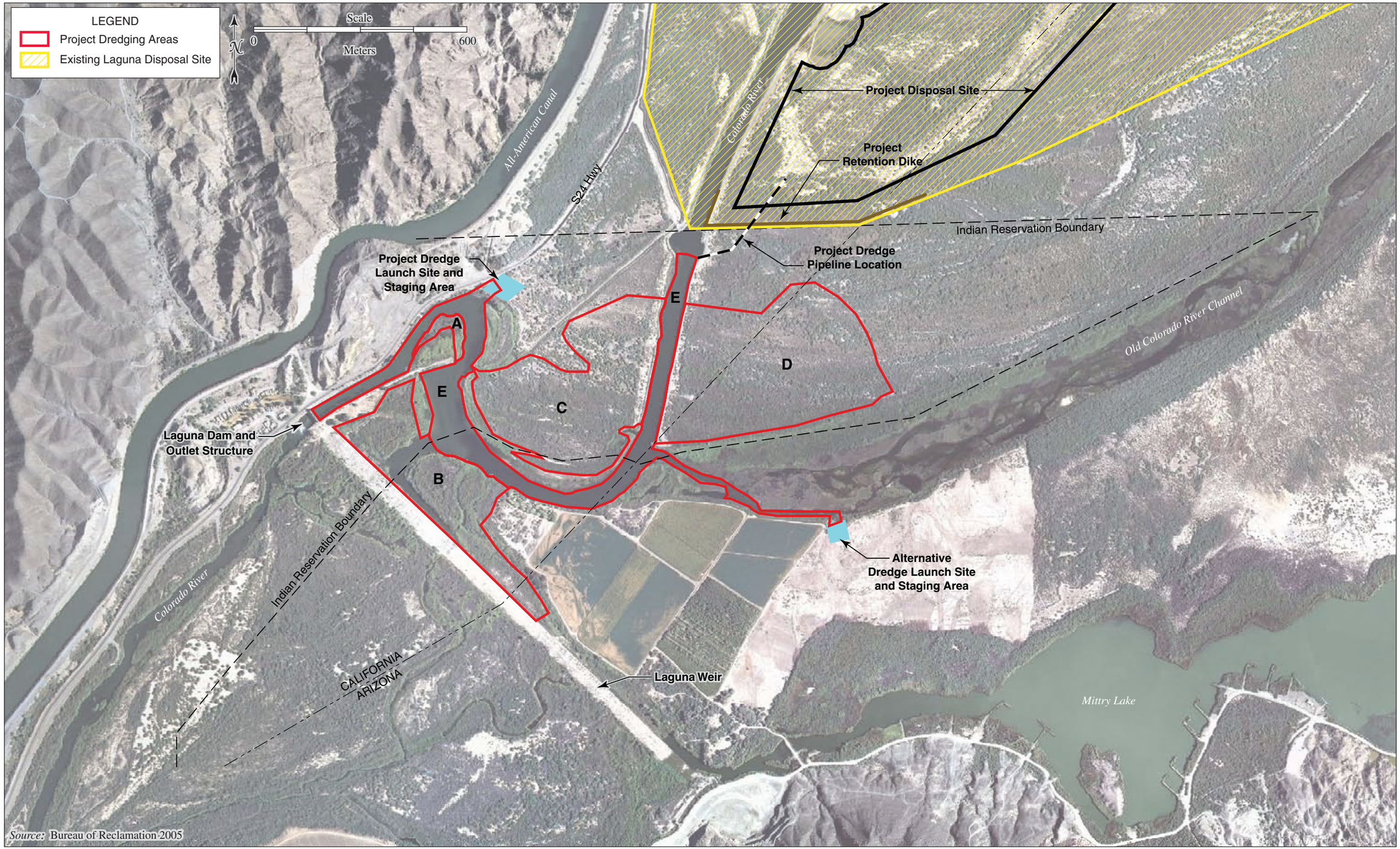

Figure 2-1. Project Layout Associated with Alternative 1 (Proposed Action)

Dredge Material Disposal Site

Dredged and excavated material would be disposed of within a small portion (approximately 116.1 acres) of the Laguna Disposal Site located north of the proposed dredging areas (Figure 2-1). The Laguna Disposal Site, which covers approximately 1,500 acres, is an existing Reclamation sediment disposal site that has been used since 1963. Other portions of the disposal site currently receive dredge material from both the Laguna and Imperial Desilting Basins.

A retention dike would be constructed along the southern boundary of the disposal site to prevent material from migrating outside the area. Containment of the dredged material would ensure no return of dredged river water directly to the river by allowing for the dredged river water to percolate into the ground water table before it reaches the river. The dike would be approximately 3,000 feet in length, 14 feet high, and would be constructed of compacted local material.

Reservoir Operation

During and after dredging, the Laguna Reservoir would operate within the range of water surface elevations that have been maintained in the past (Brown & Caldwell 2005). Historically, water levels have ranged from 141.5 feet to 151.3 feet, although on some occasions elevations have reached as high as 153.5 feet.

Future outflows from Laguna Reservoir are expected to be within the range of flows observed in past years. The expected greater reservoir capacity would provide greater flexibility in managing and regulating these outflows (Brown & Caldwell 2005).

Maintenance Activities

Once restored, the Laguna Reservoir would be maintained by dredging and vegetation removal on an as-needed basis. Reclamation expects to maintain approximately 150 surface acres of the reservoir at a minimum average depth of 10.0 feet to maintain the proposed storage capacity. Dredge material would continue to be placed within the existing 1,500 acre Laguna Disposal Site. In addition, the dredge launch site and access roads would continue to be maintained, as needed, in support of Reclamation activities.

Habitat Restoration

A total of 7.22 acres of marsh wetlands would be established to compensate for the loss of 7.22 acres of marsh wetlands that would result from the Proposed Action. Mitigation of Proposed Action impacts on wetlands would be achieved through:

- avoidance measures included as part of the Proposed Project;
- planned natural wetland establishment of 3.23 acres within the expanded Laguna Reservoir;
- restoration of wetlands for a net gain of 2.00 acres within expanded ponds at the Imperial National Wildlife Refuge (NWR); and
- creation of 1.99 acres of wetlands in an upland area at the Imperial NWR.

Reclamation has designed the Proposed Action to avoid and minimize impacts on wetlands through a reduced dredging area footprint in wetlands and locating dredging predominately in upland areas.

Wetlands that establish near hydraulic structures would be removed by periodic maintenance activities, but wetlands that establish on shallow slopes cut at the perimeter of the expanded Laguna Reservoir will be preserved as part of the mitigation for wetlands removal. An estimated 3.23 acres of natural establishment of marsh wetland vegetation would result at the shallow edges of the reservoir. Marsh wetlands that establish on the north perimeter of dredge Area C and on the north and east perimeter of dredge Area D of the new reservoir would be allowed to remain and would not be removed by periodic maintenance activities (Figure 2-2). These 3.23 acres of marsh wetlands would provide a portion of the mitigation for the loss of wetlands at the Proposed Project site.

Wetland restoration will be conducted under the Imperial Ponds Reconstruction and Expansion Project at the Imperial NWR immediately adjacent to the Colorado River approximately 10 miles north of the Laguna Reservoir site. This Project includes the expansion of ponds and associated marsh habitat in an area supporting existing ponds, marsh, and uplands that will result in a net gain of 2.00 acres of marsh wetlands. These 2.00 acres of wetlands would provide a portion of the mitigation for the loss of wetlands at Proposed Project site. The Imperial Ponds Reconstruction and Expansion Project also includes the creation of 12 acres of marsh habitat on an upland site at Imperial NWR called "Field 18". Of the 12 acres of created wetlands created at Field 18, 1.99 acres would be designated to provide a portion of the compensatory mitigation for the loss of wetlands at Proposed Project site.

2.2 Alternative 2 — 2,800 Acre-Feet Storage Reservoir

Alternative 2 is similar to Alternative 1, except the storage capacity behind Laguna Dam would increase to 2,800 af instead of 1,500 af. Under this alternative, Reclamation proposes to remove sediment and vegetation in the following areas (Figure 2-3):

- Remove vegetation and sediment of the entire island (approximately 3.5 acres) at the entrance to the outlet structure (Area A) to allow unrestricted flow through the gated structures and preclude future constriction of the outlet structure. The dredge cut would be approximately 10 feet deep.
- Dredge approximately 29.5 acres behind the dam and weir (Area B). The design of Area B under Alternative 2 includes dredging a narrow channel behind the dam along the Arizona side of the weir that would not be dredged under Alternative 1. The dredge cut would be approximately 10 feet deep. Dredging directly behind the dam would include a 50-foot buffer area from dam crest to dredge to ensure that no dam feature would be inadvertently impacted during dredging operations.
- Dredge 212.3 acres of upland area (Areas C and D). The dredge cut would be approximately 12.5 feet deep.
- Dredge approximately 34.2 acres within the existing open water channel (Area E). The approximate dredge cut would be 2.5 feet deep.

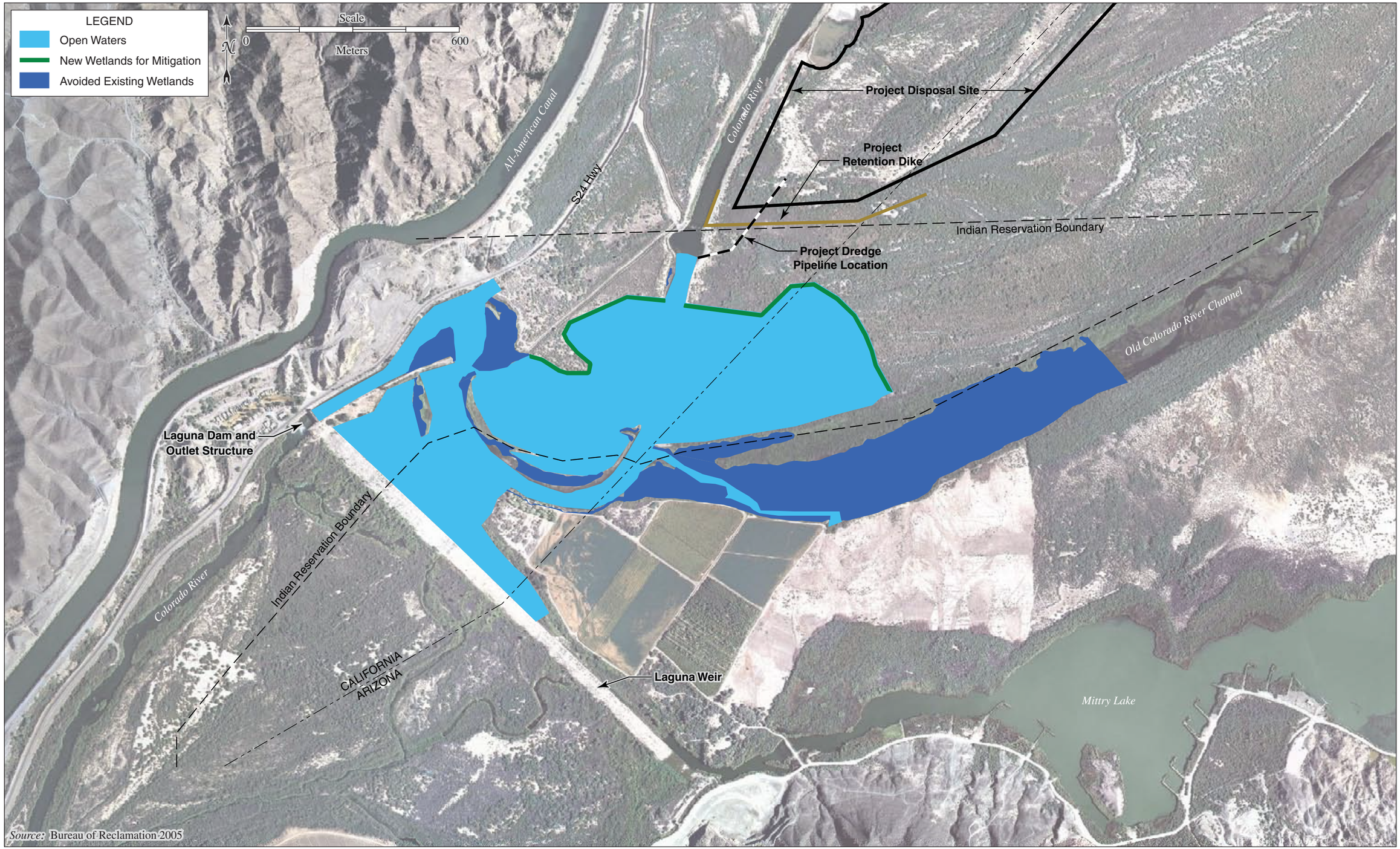

Figure 2-2. Post-Project Conditions at Laguna Reservoir

LEGEND
Project Dredging Areas
Existing Laguna Disposal Site

Scale
0 Meters 600

N

All-American Canal
S24 Hwy
Colorado River
Project Disposal Site
Project Retention Dike
Indian Reservation Boundary
Project Dredge Launch Site and Staging Area
Project Dredge Pipeline Location
Old Colorado River Channel
A
B
C
D
E
E
Laguna Dam and Outlet Structure
Indian Reservation Boundary
Colorado River
CALIFORNIA
ARIZONA
Alternative Dredge Launch Site and Staging Area
Laguna Weir
Mittry Lake

Source: Bureau of Reclamation 2005

Figure 2-3. Project Layout Associated with Alternative 2

The total dredging volume for all areas would be over 4.8 million cubic yards of material. Approximately 16.0 acres of wetlands would be removed during dredging, primarily within Areas A, B, and C, rather than 7.2 acres of wetlands as proposed under Alternative 1. Dredge operations and staging, dredge material disposal, reservoir operation, maintenance activities, and habitat restoration would be as described under Alternative 1.

The conservation measures of the LCR MSCP would apply to this alternative as a covered activity. This alternative, however, may not be fully covered under the LCR MSCP because of the larger extent of dredging activity under this alternative (final storage of 2,800 af) than was anticipated for the project as a covered activity under the LCR MSCP (final storage of 1,500 af, the same as Alternative 1).

2.3 Alternative 3 — 1,500 Acre-Feet of Storage without Wetland Avoidance Measures

Alternative 3 is similar to Alternative 1, except dredging footprints were designed to maximize functional improvements to the reservoir with the least amount of overburden instead of minimizing impacts to wetlands. Under this alternative, Reclamation proposes to remove sediment and vegetation in the following areas (Figure 2-4):

- Remove vegetation and sediment of the entire island (approximately 4.0 acres) at the entrance to the outlet structure (Area A) to allow unrestricted flow through the gated structures and preclude future constriction of the outlet structure, similar to Alternative 2. The dredge cut would be approximately 10 feet deep.
- Dredge approximately 25.5 acres behind the dam and weir (Area B), similar to Alternative 1. The dredge cut would be approximately 10 feet deep. Dredging directly behind the dam would include a 50-foot buffer area from dam crest to dredge to ensure that no dam feature would be inadvertently impacted during dredging operations.
- Dredge 84.6 acres of upland area (Areas C and D), similar to Alternative 1. The dredge cut would be approximately 12.5 feet deep. The design for the upland dredging areas includes at least a three foot horizontal to one foot vertical slope (3:1 slope) for any new bankline cuts.
- Dredge approximately 33.9 acres within the existing open water channel (Area E). The approximate dredge cut would be 2.5 feet deep.

The total dredging volume for all areas would be over 2.3 million cubic yards of material. This alternative would convert 16.1 acres of wetlands to open water instead of 7.2 acres as proposed under Alternative 1, but the two alternatives would achieve the same amount of overall reservoir capacity. Dredge operations and staging, dredge material disposal, reservoir operation, maintenance activities, and habitat restoration would be as described under Alternative 1.

The conservation measures of the LCR MSCP would apply to this alternative as a covered activity.

2.4 No-Action Alternative

Under the No-Action Alternative, no sediment dredging or vegetation removal would occur in the Laguna Reservoir, and the storage capacity behind the dam would remain at levels severely below its pre-1983 capacity. Without sufficient storage behind Laguna Dam, the reservoir would require draining at a higher frequency to contain sluicing flows, and sluicing flows would continue downstream causing large fluctuations in flows below Laguna Dam. Vegetation upstream of the weir would continue to adversely affect the structural integrity of the weir. If vegetation continues to grow across the remaining open section of the outlet structure, it would completely block flows from routing through the outlet structure when the reservoir rises during a 50 to 100 year flooding event. The No-Action Alternative would allow existing wetlands to remain, and it is anticipated that new or expanded wetlands would result as continued sediment import raises the bottom elevation of open water habitat. Under No-Action conditions, eventually the reservoir would fill with sediment and vegetation, and there would be very little to no open water.

The No-Action Alternative is not considered a practicable alternative because it does not meet the purpose and need for the proposed action. In this EA, the No-Action Alternative is equivalent to the baseline conditions described in Chapter 3, Affected Environment.

2.5 Alternatives Considered but Eliminated

Reclamation considered and screened a range of alternatives in developing the proposed action. This section contains descriptions of alternatives considered and provides reasons why these alternatives were eliminated from further consideration.

Dredging Other On-Site Locations

Several alternatives involving different dredging locations between Laguna and Imperial Dams were considered but eliminated due to excessive cost and environmental impacts. These alternatives include the following:

- Dredge the reservoir and create a large open water area immediately adjacent to the old river channel. This alternative would provide the needed reservoir storage by excavating an area 300 feet by 7,000 feet at the edge of the old river channel along with openings into the old river channel. This alternative was eliminated due to anticipated impacts to large areas of high quality wetlands associated with the old river channel.
- Dredge the reservoir and construct a flood flow channel from just downstream of Imperial Dam to Laguna Reservoir. This alternative would address the need to carry anticipated flood flows through Laguna Reservoir as well as provide additional reservoir storage. This alternative was eliminated due to the high construction costs, the relatively low expected benefits, and large environmental impacts, including impacts on wetlands.

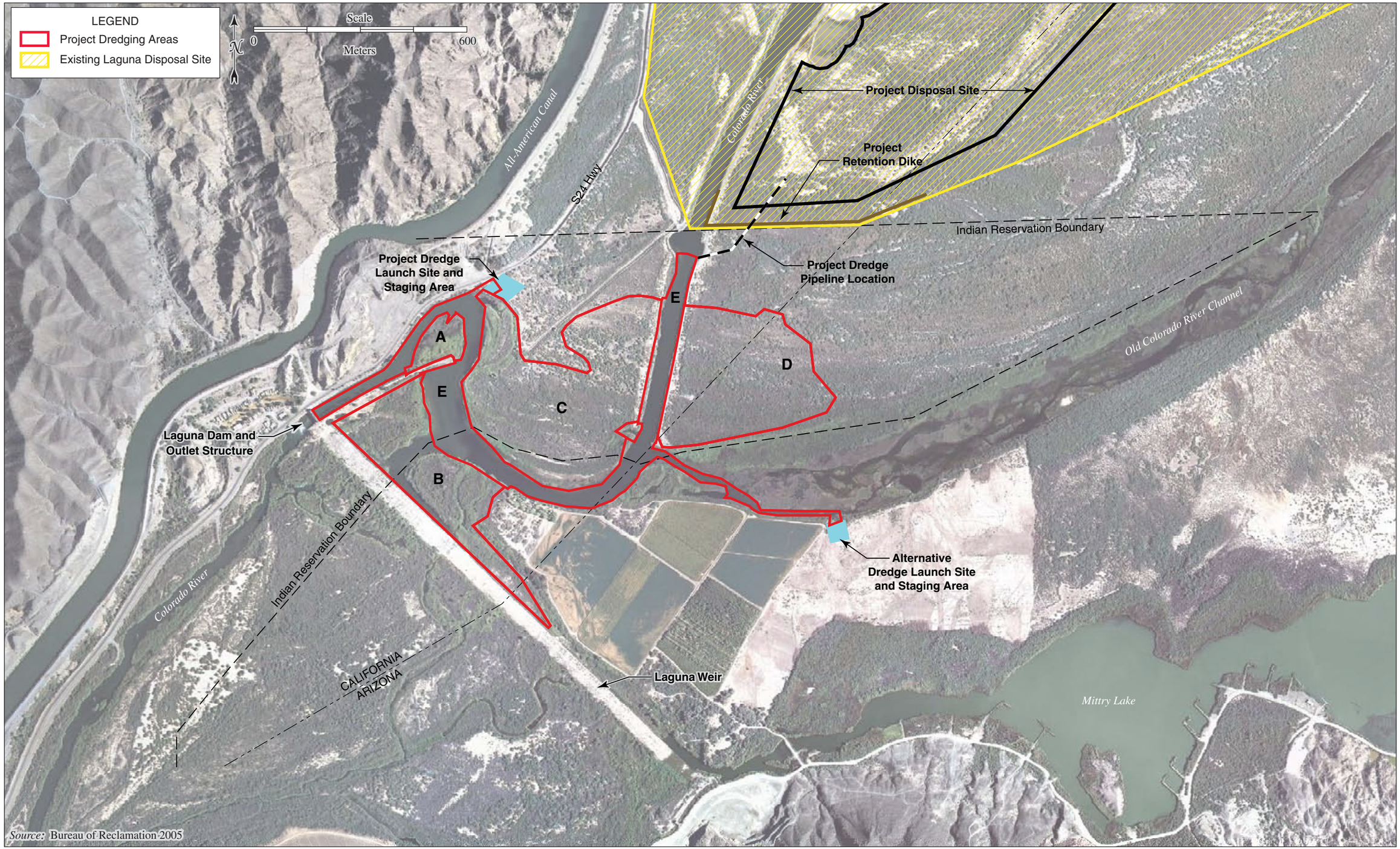

Figure 2-4. Project Layout Associated with Alternative 3

- Dredge the reservoir and old river channel and install weirs in the old river channel. The weirs would address the issue of fluctuating water surface levels for wetlands in the old river channel. This alternative was eliminated due to excessive environmental impacts on the old river channel, including impacts to a large area of associated high quality wetlands.

Off-site Construction Projects

A number of off-site alternatives were considered, but none could meet the purpose and need of the project. Two off-site construction project alternatives were considered:

- Construct a new settling basin above Imperial Dam. This alternative would provide for the capture of sediment before it reached Imperial Dam and the All-American Canal Desilting Basins. Relocating the settling basin would add considerable cost to the project and would result in increased environmental impacts. Even if the settling basin were relocated so that an alternate site could be used, additional hydraulic structures would need to be constructed to divert sluicing flows into and out of the new basin, adding even more cost to this alternative. Moving the settling basin and constructing new hydraulic control structures was considered an impracticable solution given structures already exist that meet the purpose and needs of the project. This alternative was eliminated due to the logistical feasibility, high cost, and high environmental impacts.
- Construct a new detention structure and reservoir downstream of the existing Laguna Dam. Such a structure could capture sluicing flows downstream of the existing Laguna Reservoir. This alternative would require the construction of new hydraulic structures. There is no ideal location for constructing a new water control detention structure or dam below the existing Laguna Dam. Even if there were a logistically practicable site, the cost to build such a structure would be considerable relative to on-site actions, and a new dam would require multiple federal approvals that would delay and potentially prevent implementation. Therefore, constructing a new dam downstream to capture sluicing flows was considered not practicable because of cost, site logistics, issues of availability, the fact that structures already exist that are capable of performing the desired functions, and impacts on agricultural areas.

Mechanical Sediment Removal

Sediment collected in the Laguna Settling Basin that requires periodic sluicing comes from three sources: the All-American Canal Desilting Basins, the Gila Gravity Main Canal Sluiceway, and from the backwater behind Imperial Dam. Of these three sources, sediment removed from the All-American Canal comprises approximately 95 percent of the sediment input to the river below Imperial Dam. Therefore, alternatives considered that would minimize the need for sluicing operations focused on reducing the amount of sediment introduced from the All-American Canal.

Two mechanical approaches (i.e., not using sluicing flows) were considered, but were determined to be either environmentally damaging or impractical compared to current sluicing operations. One approach would be to pump the All-American Canal slurry from the discharge point at the California Sluiceway to the disposal site. Another approach would be to dry the slurry at the dam and then truck the material to the disposal site and continuously distribute the material with bulldozers and other equipment.

- Pump slurry directly from Imperial Reservoir to dredge disposal site. This mechanical approach would take the high concentration slurry that is currently discharged into the sluiceway and pump it directly to the disposal area. This approach would require some capital cost as well as operation and maintenance costs, but those costs would likely be manageable. Such an operation, however, would remove most of the water that enters the river below Imperial Dam. This water provides much of the downstream flow below Laguna Dam. Since this water and associated sediment would be discharged at the disposal site, the water would likely resurface downstream once the groundwater had surcharged sufficiently, but little to no water would flow between Imperial Dam and the Laguna Settling Basin rock weir about 3 miles downstream. The environmental impacts of this flow reduction would be substantially greater than that expected from dredging the existing reservoir at Laguna Dam. Therefore, this alternative was considered more environmentally damaging than other solutions and was screened from further consideration.
- Dry the sediment at Imperial Reservoir and truck it to the disposal area. This alternative approach contains inherent costs and hazards associated with a continual trucking operation. A new settling pond at Imperial Dam would be required to remove water from sediments to minimize hauling and handling costs. A cost effective method for removal of most of the water is not available. If complete dewatering could be accomplished and only the sediment volume had to be moved, an average of 140 tons of material per day would need to be mechanically moved to the disposal area and distributed. If a weight of 100 pounds per cubic foot is assumed, then 140 tons equates to about 105 cubic yards of material. The removal and disposal of that amount of material would cost an estimated $1.2 million a year. With the additional costs of trucks, loader, dozer, and the dewatering system, the total cost of this effort would be two to three times the cost of the Proposed Action. A continuous operation of this nature could result in substantial air quality issues from dust generation, would add additional traffic hazards along State Highway 24 (S-24), and would result in continual disturbance to humans and wildlife on a daily basis for an indefinite period. This alternative was considered impractical primarily due to cost and technical feasibility and was screened from further consideration.

Laguna Dam Modifications

Increasing the height of Laguna Dam could increase the storage capacity behind the dam. This alterative would include installation of a three-foot high inflatable bladder on top of Laguna Dam that would increase the dam elevation to approximately 154 feet above mean sea level. This alternative was eliminated due to the excessive environmental impacts that would result from the large area that would be inundated by a higher dam and due to the direct adverse impacts to the historic dam structure and appearance from such modifications.

Decommissioning Laguna Dam

A commenter in the scoping process suggested that the decommissioning of Laguna Dam should be considered as an alternative. The removal of Laguna Dam would not meet the project purpose as sluicing flows from Imperial Dam would be uncontrolled in downstream reaches and the operational flexibility provided by the Laguna Reservoir would be lost. With Laguna Dam

removed, sediment would be initially flushed into the Yuma Division and the Alamo Canal in Mexico at Morelos Dam as the river sought a new elevation in the Laguna Division and downstream areas would be put at risk. The removal of Laguna Dam could result in very large environmental impacts including the potential loss of wetlands and endangered species habitat in the old river channel and draining of Mittry Lake. The reduction or loss of Mittry Lake would substantially impact recreational activities in this region. This alternative was not considered further because it would not meet the project purpose and because it would result in substantial environmental impacts, operational impacts, safety concerns, and reduction in recreational use.

2.6 Summary of Impacts

The analysis presented in this EA indicates that implementation of the Proposed Action or other alternatives would not result in significant impacts for any resource area. The No-Action Alternative, however, may be associated with potentially significant impacts. The environmental consequences associated with implementation of these alternatives, after implementation of applicable mitigation measures, are presented and compared in Table 2-2. For a detailed description and analysis, refer to Chapter 3.0, Affected Environment and Environmental Consequences.

Table 2-2. Summary of Impacts

Resource Area	***Alternative 1 (Proposed Action)***	***Alternative 2***	***Alternative 3***	***No-Action Alternative***
Aesthetics	No Significant Impact	No Significant Impact	No Significant Impact	No Significant Impact
Air Quality	No Significant Impact	No Significant Impact	No Significant Impact	No Impact
Biological Resources	No Significant Impact	No Significant Impact	No Significant Impact	Potentially Significant Impact
Cultural Resources	No Significant Impact	No Significant Impact	No Significant Impact	Potentially Significant Impact
Environmental Justice	No Significant Impact	No Significant Impact	No Significant Impact	No Impact
Hazards/Hazardous Materials	No Significant Impact	No Significant Impact	No Significant Impact	No Impact
Hydrology/Water Quality	No Significant Impact	No Significant Impact	No Significant Impact	Potentially Significant Impact
Indian Trust Assets	No Significant Impact	No Significant Impact	No Significant Impact	No Impact
Land Use	No Significant Impact	No Significant Impact	No Significant Impact	Potentially Significant Impact
Noise	No Significant Impact	No Significant Impact	No Significant Impact	No Impact

Table 2-2. Summary of Impacts (continued)

Resource Area	*Alternative 1 (Proposed Action)*	*Alternative 2*	*Alternative 3*	*No-Action Alternative*
Public Resources	No Significant Impact	No Significant Impact	No Significant Impact	Potentially Significant Impact
Socioeconomics	No Significant Impact	No Significant Impact	No Significant Impact	No Impact
Topography, Geology, Soils, and Mineral Resources	No Significant Impact	No Significant Impact	No Significant Impact	No Impact

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3.0 Affected Environment

Chapter 3 includes baseline information for each resource potentially affected by the proposed action, as well as a discussion of environmental consequences of the No-Action Alternative and proposed action and alternatives. Mitigation measures are identified as needed for impacts.

Reclamation has determined that implementation of the proposed action would result in negligible impacts to transportation. Actions generating vehicle trips relate only to the arrival of dredging and other associated equipment at the beginning of the project, removal of equipment at the end of each project activity, and the daily arrival and departure of persons operating the dredge equipment. Dredging activities would not alter or encroach upon any public roadways. Therefore, transportation issues are not discussed further in this EA.

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3.1 Aesthetics

This section addresses the potential temporary aesthetic impacts resulting from construction dredging and maintenance activities, as well as long-term impacts from creation of a larger capacity storage reservoir.

3.1.1 Affected Environment

Visual resources consist of the natural and manmade features that give a particular environment its aesthetic qualities, referred to as its landscape character. Landscape character is evaluated to assess whether a proposed action would appear compatible with the existing setting or would contrast noticeably with the setting and appear out of place. Visual resources also have a social setting, which includes public values, goals, awareness, and concern regarding visual quality. Social setting is addressed as visual sensitivity, or the relative degree of public interest in visual resources and concern over adverse changes in the quality of that resource.

The project site is accessible through existing recreational access points (i.e., Mittry Lake Wildlife Area and Betty's Kitchen Wildlife Area and Interpretive Trail), and fishing and picnic areas are located on the margin of the reservoir within the project area. There is also a small recreational trailer park located across S-24 near the Laguna Dam. Recreational uses are generally considered to have high visual sensitivity.

Visual resources within the project area generally include open space, agricultural areas, large expanses of open waterways, and wetland, marsh, and desert upland habitats located in and near the Colorado River floodplain. Most of the landscape appears natural (undisturbed) with very few human-made landscape alterations, and as such, many opportunities exist for undisturbed views. Prominent vegetation includes agricultural land and patches of desert scrub, salt cedar, cottonwood-willow, and other riparian lands. Other visible water development in the area consists of the All-American Canal west of the project site, as well as the Colorado River and Old Colorado River north and east of the site. Due to the generally flat topography in the vicinity of the project area and limited intervening development, views are possible when located at higher elevations to the west or at sites immediately near the Laguna Dam and reservoir. Due to overall distance and tall vegetation, views from Mittry Lake recreational areas are not expected.

Few sources of light and minimal built structures contribute to offsite glare. Relatively undisturbed, expansive views of the nighttime sky are expected to be readily available due to the small amount of intervening night lighting sources. However, sources of light and glare associated with headlights and window reflection from passing vehicles on S-24 (a California state highway) and reservoir access routes are expected at times. In addition, the existing Laguna Dam facility has some low lighting for security and pedestrian access.

3.1.2 Environmental Consequences and Mitigation Measures

3.1.2.1 Alternative 1 — Proposed Action

The proposed action was evaluated with regard to its potential to create visual impacts resulting from changes in scenic vistas, changes or damage to scenic resources, or degrading the visual character of a site, taking into account the public's anticipated perception of the existing visual resources onsite, and their visual setting. Potential impacts to aesthetic resources would result primarily from removal of wetland areas and other mature vegetation to expand the capacity of an existing reservoir area. Impacts from potential light sources were also considered, although no components of the project would require substantial lighting.

The environmental consequences of implementation of habitat restoration under the LCR MSCP, including the specific wetlands restoration activities at the Imperial NWR, have been addressed in separate NEPA compliance documents, the LCR MSCP EIS (LCR MSCP 2004a) and the Lower Colorado River National Wildlife Refuges Comprehensive Management Plan EA (USFWS 1994), respectively.

Environmental Consequences Dredging and ongoing maintenance activities would be visible from offsite vantage points, including nearby recreational areas, and would temporally reduce the visual quality of the reservoir area. Impacts from dredging and material stockpiling could last from several months to several years, although only portions of the reservoir area would be under development at any one time. While these activities could degrade the existing visual character or quality of a site, the impact would be temporary both during initial dredging of the expanded reservoir, as well as during maintenance dredging activities. Although the proposed dredging and maintenance activities would be recognized within current views, the Project would be consistent with the existing water development throughout the project area. Therefore, the majority of existing views would remain undisturbed following Project implementation and significant impacts to scenic views or vistas would not occur.

Expanding the reservoir area would enhance the scenic quality of the land, consistent with nearby waterways. Expanding reservoir capacity, and the potential for recreational uses on the water, would also visually link other waterways in the project vicinity. The expansion of open water areas could lead to increases in boating opportunities in the project area, which could increase wave action on adjacent habitats. Reclamation may pursue boat speed restrictions in the project area .

During construction and maintenance dredging activities, temporary use of lighting may be required, resulting in potential offsite glare, particularly if any dredging activities occur at night. If dredging were to occur at night requiring the use of night lighting, it is expected that presently unobstructed views of the nighttime sky would be adversely affected in a limited area. In addition, the use of site lighting on key areas and walkways for security purposes, could result in light and glare impacts.

Mitigation Measures With implementation of the following mitigation measure, potential offsite light and glare impacts during construction and maintenance activities would be less than significant:

- Security and night lighting shall be directed downward and inward through use of standard light shields or hoods toward the area to be illuminated, in order to minimize offsite light and glare.

3.1.2.2 Alternative 2

Under this alternative, approximately 16.0 acres of wetland area would be removed and converted to open water, and increased dredging activity and storage would be required to expand reservoir capacity to 2,800 acre-feet. Dredging activities also would occur closer to the Old Colorado River Channel, the Mittry Lake Wildlife Area, and other nearby recreational areas. Compared to the proposed action, this alternative would have greater visual impacts due to the increased dredging and maintenance activity, although with implementation of the mitigation measure provided for Alternative 1, aesthetic impacts would remain less than significant.

3.1.2.3 Alternative 3

Under this alternative, approximately 16.1 acres of wetland area would be removed and converted to open water, although dredging activity and storage would be the same as for the proposed action. Compared to the proposed action, this alternative would have greater visual impacts because additional wetland area would be removed to accommodate the same reservoir storage capacity as for the proposed action. Although this increased loss in vegetation could impact the scenic quality of the reservoir area, impacts would remain less than significant, with implementation of the mitigation measure provided for Alternative 1, due to the overall benefit of providing new open waterway.

3.1.2.4 No-Action Alternative

Under the No-Action Alternative, excavation and vegetation removal activities would not occur and the storage capacity of the reservoir would not be enlarged. If sedimentation is allowed to continue, the reservoir could fill completely with sediment and vegetation, leaving very little to no open water. Therefore, the long-term beneficial effects associated with the Project would not result under this alternative.

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3.2 Air Quality

Air emissions produced by the Project mainly may affect air quality within the Counties of Imperial, California and Yuma, Arizona. The following section describes the existing air quality within these regions and the air regulations that would apply to the proposed action and its alternatives.

3.2.1 Affected Environment

The U.S. Environmental Protection Agency (USEPA) establishes the National Ambient Air Quality Standards (NAAQS), which represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The USEPA designates all areas of the U.S. as having air quality better than or equal to (attainment) or worse than (nonattainment) the NAAQS. A nonattainment designation generally means that a primary NAAQS has been exceeded more than once per year in an area. The southwest portion of Yuma County, Arizona is in "moderate" nonattainment for the national PM_{10} (respirable particulate matter) standard. This area is known as the Yuma PM_{10} nonattainment area. Otherwise, the remainder of the project area attains all NAAQS.

State and local agencies may establish air quality standards and regulations of their own, provided these are at least as stringent as the Federal requirements. The Arizona Department of Environmental Quality (ADEQ) has adopted the NAAQS for purposes of regulating air quality in Arizona. The state of California has adopted the California Ambient Air Quality Standards (CAAQS), which are established by the California Air Resources Board (ARB). In regard to the CAAQS, Imperial County is presently in "marginal" nonattainment for the 8-hour ozone (O_3) standard, and is presently in nonattainment for O_3 and PM_{10}. Otherwise, the project region attains all other national and state ambient air quality standards.

3.2.1.1 Regulatory Setting

The Federal Clean Air Act of 1969 (CAA) and its subsequent amendments establish air quality regulations and the NAAQS and delegate the enforcement of these standards to the states. The ADEQ regulates sources of air emissions within Arizona. In California, the ARB enforces air pollution regulations and sets guidelines to attain and maintain the national and state ambient air quality standards within the state of California. These guidelines are found in the California State Implementation Plan (SIP). The Imperial County Air Pollution Control District (ICAPCD) regulates sources of air emissions within Imperial County. The following section provides a summary of the air quality rules and regulations that apply to the proposed action.

ADEQ Rules and Regulations The ADEQ develops rules and regulations to regulate stationary sources of air pollution in Arizona. Since the project site occurs within an area that does not attain the NAAQS for PM_{10}, ADEQ Rule 18-2-14 states that a Federal agency cannot support an activity unless the agency determines that the activity will conform to the most recent USEPA-approved SIP within the region of the proposed project. This means that federally-supported or funded activities will not (1) cause or contribute to any new air quality standard violation, (2) increase the

frequency or severity of any existing standard violation, or (3) delay the timely attainment of any standard, interim emission reduction, or other milestone. Therefore, Reclamation is required to perform conformity applicability analyses to determine if the proposed action would exceed the PM_{10} *de minimis* threshold of 100 tons per year.

ICAPCD Rules and Regulations The ICAPCD develops the *Rules and Regulations of the Imperial County Air Pollution Control District* to regulate stationary sources of air pollution in the County (ICAPCD 2005). The purpose of Regulation VIII is to reduce PM_{10} emissions generated from anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce, or mitigate PM_{10} emissions. Since the project area within Imperial County is in marginal nonattainment for the O_3 NAAQS, Rule 925 states that the proposed action would conform to the SIP if its annual emissions remain below 100 tons of nitrogen oxides (NOx) or volatile organic compounds (VOCs). The ICAPCD relies on the project proponent to comply with all applicable ICAPCD rules and to implement mitigation measures identified in the CEQA Air Quality Handbook to reduce air quality impacts to an insignificant level (ICAPCD 2005). The air quality mitigation measures discussed below include the ICAPCD requirements that would attain this objective.

3.2.2 Environmental Consequences and Mitigation Measures

The following presents an analysis of the air quality impacts associated with the Project. Emission sources would include combustive and fugitive dust (PM_{10}) emissions generated by the proposed dredging and support activities.

Criteria to determine the significance of air quality impacts are based on federal, state, and local air pollution standards and regulations. The ADEQ and the ICAPCD have not established criteria for assessing the significance of air quality impacts for NEPA purposes. Therefore, in order to assess the significance of air quality impacts under NEPA, impacts would be potentially significant if project emissions exceed the thresholds that trigger a conformity determination, as described above (100 tons per year for VOC, NO_x, or PM_{10}). While the project region attains the ambient air quality standards for carbon monoxide (CO) and sulfur dioxide (SO_2), this analysis also adopts the conformity thresholds of moderate nonattainment areas for these pollutants (100 tons per year) as significance criteria. This is a conservative approach, as the CO and SO_2 thresholds are designed to assess the potential for emission sources to impact a nonattainment area for these pollutants. If project emissions were determined to increase ambient pollutant levels from below to above a national or state ambient air quality standard, these emissions would be significant.

The environmental consequences of implementation of habitat restoration under the LCR MSCP, including the specific wetlands restoration activities at the Imperial NWR, have been addressed in separate NEPA compliance documents, the LCR MSCP EIS (LCR MSCP 2004a) and the Lower Colorado River National Wildlife Refuges Comprehensive Management Plan EA (USFWS 1994), respectively.

3.2.2.1 Alternative 1 — Proposed Action

Environmental Consequences Air pollutant emissions produced from the proposed dredging and support activities were estimated using the most current emission factors and methods, then

compared to the criteria identified above to determine their significance. Based upon activity and scheduling data estimated for the proposed action (Reclamation 2005f), the analysis estimated total and peak annual emissions for the (1) initial dredging project and (2) maintenance dredging activities. For the first scenario, peak annual emissions would occur during the second year of operation and only would include dredging and demobilizing activities. For the second scenario, it is assumed that all activities would occur within the same year and, therefore, would contribute to peak annual emissions.

Factors used to estimate emissions from construction and dredging equipment were obtained from the *ARB OFFROAD Model* (ARB 1999) and the USEPA *AP-42* document (USEPA 1995 and 1996). Details of emission source data and calculations used to estimate emissions from the proposed action are included in Appendix B of this EA.

A summary of the annual emissions that would occur from initial project dredging and maintenance dredging is presented in Tables 3-1 and Table 3-2, respectively. As indicated in these tables, project air emissions would remain below all emission significance thresholds for both the initial and maintenance dredging.

Table 3-1. Peak Annual Emissions for Initial Dredging Activities - Proposed Action

Project Activity	***Peak Annual Emissions (Tons)***				
	VOC	CO	NOx	SOx	PM10
Dredging	3.46	15.06	42.39	0.58	5.21
Demobilizing/Dredge and Piping	0.00	0.02	0.05	0.00	0.00
Peak Year Emissions	**3.46**	**15.08**	**42.45**	**0.58**	**5.21**
NEPA Significance Thresholds	**100**	**100**	**100**	**100**	**100**
Note: Peak annual emissions period only would include dredging and demobilizing/dredge and piping activities.					

Table 3-2. Peak Annual Emissions for Maintenance Dredging Activities - Proposed Action

Project Activity	***Peak Annual Emissions (Tons)***				
	VOC	CO	NOx	SOx	PM10
Vegetation Removal	0.01	0.05	0.14	0.00	0.49
Launch Ramp Construction	0.01	0.04	0.11	0.00	0.00
Mobilizing/Dredge and Piping	0.00	0.02	0.05	0.00	0.00
Maintenance Dredging	2.19	9.83	27.50	0.38	3.26
Access Road Construction and Maintenance	0.00	0.01	0.03	0.00	0.04
Demobilizing/Dredge and Piping	0.00	0.02	0.05	0.00	0.00
Annual Emissions	**2.22**	**9.96**	**27.89**	**0.39**	**3.79**
NEPA Significance Thresholds	**100**	**100**	**100**	**100**	**100**
Note: Peak annual emissions period would include all activities.					

Conformity Applicability Analysis Tables 3-3 and 3-4 summarize the annual conformity emissions that would occur from initial project dredging and maintenance dredging, respectively, associated with the proposed action. These data are relevant for use in the project conformity applicability analysis for either Imperial or Yuma Counties within the project region. Consistent with the conformity guidelines, the dredge booster pump emissions are not included in this analysis, as this source would require an ICAPCD air permit and, therefore, would conform to the SIP. The data in Tables 3-3 and 3-4 show that emissions associated with each set of activities (1) would not exceed any conformity *de minimis* threshold for the project region and (2) would not be regionally significant, as they would be substantially less than 10 percent of any air pollutant estimated for the Imperial and Yuma Counties emissions inventory. Therefore, the proposed action would conform to the applicable SIPs and would not trigger a conformity determination. Appendix B presents the emission calculations associated with the project conformity applicability analysis.

Table 3-3. Peak Annual Conformity Emissions for Initial Dredging Activities — Proposed Action

Project Activity	***Peak Annual Emissions (Tons)***		
	VOC	NO_X	PM_{10}
Dredging	3.35	40.26	5.16
Demobilizing/Dredge and Piping	0.00	0.05	0.00
Peak Year Emissions	**3.36**	**40.31**	**5.16**
Conformity Thresholds	**100**	**100**	**100**
Note: Peak annual emissions period only would include dredging and demobilizing/dredge and piping activities.			

Table 3-4. Peak Annual Conformity Emissions for Maintenance Dredging Activities — Proposed Action

Project Activity	***Peak Annual Emissions (Tons)***		
	VOC	NO_X	PM_{10}
Vegetation Removal	0.01	0.14	0.49
Launch Ramp Construction	0.01	0.11 05	0.00
Mobilizing/Dredge and Piping	0.00	0.05	0.00
Maintenance Dredging	2.04	24.65	3.19
Access Road Construction and Maintenance	0.00	0.03	0.04
Demobilizing/Dredge and Piping	0.00	0.05	0.00
Annual Emissions	**2.07**	**25.04**	**3.72**
Conformity Thresholds	**100**	**100**	**100**
Note: Peak annual emissions period would include all activities.			

Mitigation Measures To ensure that the proposed action produces less then significant air quality impacts, Reclamation shall comply with the requirements of Regulation VIII, as outlined in the following rules:

- Rule 800 – General Requirements for Control of Fine Particulate Matter
- Rule 801 – Construction and Earthmoving Activities
- Rule 802 – Bulk Materials
- Rule 803 – Carry-out and Track-out
- Rule 804 – Open Areas
- Rule 805 – Paved and Unpaved Roads
- Rule 806 – Conservation Management Practices

In addition to a variety of dust control measures outlined in these rules, ICAPCD Rule 801 requires the development of a dust control plan for construction sites of 5 acres or more for non-residential developments. Reclamation should consult with the ICAPCD to ensure project compliance with the requirements of Regulation VIII. Reclamation shall also implement the feasible mitigation measures identified in Section 7.1 of the ICAPCD *CEQA Air Quality Handbook* (Construction Equipment and Fugitive PM_{10} Mitigation Measures) that are not part of the Regulation VIII requirements.

To ensure that the project produces less then significant air quality impacts within the Arizona project region, Reclamation shall comply with the following requirements of ADEQ Rule 18-2-804, roadway and site cleaning machinery:

- Limit visible emissions exceeding 40 percent opacity from roadway and site cleaning machinery to less than 10 seconds. The start up of cold equipment may have visible emissions for the first 10 minutes.
- Take reasonable precautions, including use of dust suppressants and removal of dirt from paved streets, to prevent particulate matter from becoming airborne.

Successful implementation of the above requirements would reduce project air quality impacts to less then significant levels.

3.2.2.2 Alternative 2

Air pollutant emissions produced from the dredging and support activities associated with Alternative 2 were estimated with the same methods used for the proposed action (section 3.2.2.1). A summary of the annual emissions that would occur from initial dredging under Alternative 2 is presented in Table 3-5. As for maintenance dredging activities, it is expected that the magnitude of activities and resulting emission from Alternative 2 would be nearly identical to those estimated for the proposed action as shown in Table 3-2. As indicated in these tables, air emissions from Alternative 2 would remain below all emission significance thresholds for both dredging activities. As a result, with the implementation of proposed mitigation measures identified under Alternative 1, air emissions from Alternative 2 would produce less than significant air quality impacts.

Table 3-5. Peak Annual Emissions for Initial Dredging Activities - Alternative 2

Project Activity	*Peak Annual Emissions (Tons)*				
	VOC	CO	NOx	SOx	PM10
Dredging	4.80	20.87	58.74	0.81	7.22
Peak Year Emissions	4.80	20.87	58.74	0.81	7.22
NEPA Significance Thresholds	**100**	**100**	**100**	**100**	**100**
Note: Peak annual emissions based upon one-third of the total dredging emissions.					

3.2.2.3 Alternative 3

Air pollutant emissions associated with the dredging and support activities from Alternative 3 would be nearly identical to those estimated for the proposed action. Summaries of the annual emissions that would occur from initial dredging and maintenance dredging activities are presented in Tables 3-1 and Table 3-2, respectively. As indicated in these tables, air emissions from Alternative 3 would remain below all emission significance thresholds for both dredging activities. As a result, with the implementation of proposed mitigation measures identified under Alternative 1, air emissions under Alternative 3 would produce less than significant air quality impacts.

3.2.2.4 No-Action Alternative

Under the No-Action Alternative, Reclamation would not conduct dredging operations at the Laguna Reservoir. Therefore, the No-Action Alternative would produce less than significant impacts to air quality.

3.3 Biological Resources

Biological information for this section is derived from several sources including the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) documents (Final Habitat Conservation Plan, Biological Assessment, Environmental Impact Statement/Environmental Impact Report prepared by the LCR MSCP in 2004; Biological and Conference Opinion prepared by United States Fish and Wildlife Service [USFWS] in 2005); wetland delineation and habitat mapping report for the project area (SWCA 2002); aerial photos; Reclamation GIS data for the project area (Reclamation 2005f); California Natural Diversity Database (CNDDB) (2005); and existing scientific literature for sensitive species. For the purposes of this discussion, habitat mapping conducted by Reclamation in 2005 using standard Anderson and Ohmart (1984) land cover classification for the lower Colorado River has been incorporated. Wetland delineation and specific wetland plant community descriptions follow SWCA (2002).

The project area is located above Laguna Dam in Reach 6 of the LCR MSCP planning area. Areas potentially affected by the Project include those areas above the dam that would be dredged to increase storage capacity, the existing dredge material disposal site where future dredge material resulting from the Project would be disposed, and other areas where project activities would occur (e.g., access facilities, construction staging areas). Changes in operation of the basin resulting from additional storage capacity would not substantially affect water levels or fluctuations in water levels beyond historical values.

3.3.1 Affected Environment

3.3.1.1 Regulatory Setting

Endangered Species Act (16 U.S.C. 1531 et seq.) The purpose of the ESA is to conserve and recover federally listed endangered and threatened species and the ecosystems upon which they depend. Federal agencies that engage in actions that may affect species listed under the ESA are required under ESA section 7 to consult with the USFWS to determine if their actions could jeopardize the continued existence of the species or destroy or adversely modify designated critical habitat. ESA Section 9 prohibits the taking of a listed species without authorization from the USFWS. USFWS defines "take" to include the harassment, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting, or the attempt to engage in such conduct. Harm can include habitat modification or degradation that kills or injures wildlife. ESA section 7 provides a means by which USFWS authorizes incidental take of listed species.

Migratory Bird Treaty Act (16 U.S.C. 703 et seq.) and Executive Order 13186 The Migratory Bird Treaty Act (MBTA) governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. The take of all migratory birds is governed by the MBTA's regulation of taking migratory birds for educational, scientific, and recreational purposes and requiring harvest to be limited to levels that prevent overuse. The MBTA also prohibits the take, possession, import, export, transport, selling, purchase, barter, or

offering for sale, purchase or barter, any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit (50 CFR 21.11).

Executive Order (EO) 13186 (effective January 10, 2001), outlines the responsibilities of Federal agencies to protect migratory birds, in accordance with the MBTA, the Bald and Golden Eagle Protection Acts, the Fish and Wildlife Coordination Act, ESA, and NEPA. This order specifies the following:

- The USFWS as the lead for coordinating and implementing EO 13186;
- Requires Federal agencies to incorporate migratory bird protection measures into their activities; and
- Requires Federal agencies to obtain permits from USFWS before any "take" occurs, even when the agency intent is not to kill or injure migratory birds.

Clean Water Act and Executive Order 11990 The Federal Water Pollution Control Act and subsequent amendments, collectively known as the Clean Water Act (CWA) (33 USC § 1251 et seq.), were enacted by Congress to restore and maintain the chemical, physical, and biological integrity of U.S. waters. Section 404 of the CWA requires a permit from the U.S. Army Corps of Engineers (USACE) for the discharge of dredged or fill material into waters of the U.S., including wetlands. Under the CWA, wetlands are defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. EO 11990, dated 24 May 1977 and amended by EO 12608 on 9 September 1987, requires Federal agencies to minimize the destruction, loss, or degradation of wetlands and to enhance their natural and beneficial values.

Rivers and Harbors Act Section 10 of the Rivers and Harbors Act of 1899 (33 USC 401, et seq.) requires Congressional approval for the building of any wharf, pier, jetty, and other structures in navigable waters. Section 10 also requires the approval of the USACE for any excavation or fill within navigable waters. The Rivers and Harbors Act covers construction, excavation, or deposition of materials in, over, or under navigable waters. Activities such as dredging, disposing of dredged materials, excavating, filling, or construction of structures in navigable waters require a Section 10 permit from USACE.

Fish and Wildlife Coordination Act (16 U.S.C. §§ 661-667e) The Fish and Wildlife Coordination Act and subsequent amendments provides that whenever the waters or channel of a body of water are modified by a department or agency of the U.S., the department or agency first shall consult with the USFWS and with the head of the agency exercising administration over the wildlife resources of the state where construction will occur, with a view to the conservation of wildlife resources. The Act provides that land, water and interests may be acquired by federal construction agencies for wildlife conservation and development. In addition, real property under jurisdiction or control of a Federal agency and no longer required by that agency can be utilized for wildlife conservation by the state agency exercising administration over wildlife resources upon that property.

Biological and Conference Opinion for LCR MSCP A biological and conference opinion for the LCR MSCP was prepared in 2005 by USFWS, addressing the effects to 27 species for which six Federal agencies and 24 Permit Applicants from Arizona, California, and Nevada requested incidental take coverage under Section 7 and Section 10 of the ESA. The biological and conference opinion determined that the proposed actions described herein are not likely to jeopardize the continued existence of listed, candidate, or other covered species, and are not likely to destroy or adversely modify designated or proposed critical habitat.

The USFWS biological and conference opinion addresses impacts from the Proposed Laguna Reservoir Restoration Project as part of the LCR MSCP covered Federal actions and includes incidental take statements for species known to be in the vicinity of the Project including the Federally listed endangered Yuma clapper rail (*Rallus longirostris yumanensis)*, Federally listed endangered southwestern willow flycatcher (*Empidonax traillii extimus)*, and Federal candidate for listing yellow-billed cuckoo (*Coccyzus americanus)*.

3.3.1.2 Vegetation

Plant communities within the planning area are represented in Figure 3-1 (the planning area includes the Colorado River between Imperial Dam and Laguna Dam for context) and Table 3-6 (from LCR MSCP 2004b; Reclamation 2005f). Land cover types within the project planning area are described below.

Table 3-6. Land Cover Types Within the Project Planning Area[1]

Community Type	*Acres*
Agriculture[2]	72.3
Arrowweed	158.7
Backwater	7.8
Marsh (includes compositional types 1, 5, and 6)	100.2
Open Water	163.7
Saltcedar-III (includes structural types III, IV, and V)	879.0
Saltcedar Honey Mesquite[2]	8.6
Saltcedar Screwbean Mesquite[2]	5.1
Cottonwood/Willow	38.2
Undifferentiated	291.2
Non-classified[2]	0.9
Total	**1,725.7**

1. The planning area includes the Colorado River and its historic floodplain between Imperial Dam and Laguna Dam for context.

2. These land cover types do not occur within the Proposed Project footprint and are provided here for context as land cover types in the vicinity.

Arrowweed The arrowweed land cover type historically formed dense, monotypic, linear belts or small stands of vegetation along drier portions of the Colorado River floodplain, adjacent to stands of cottonwood-willow (Ohmart et al. 1988). It is characterized by nearly monotypic stands of arrowweed (*Pluchea sericea*) within the riverine corridor. In addition to this location, it is found along canyon bottoms and irrigation ditches, around springs, and in washes with sandy or gravelly channels (Holland 1986; D. Brown 1994; Sawyer and Keeler-Wolf 1995).

Arrowweed reproduces both by seed and vegetatively. The seeds are tiny (less than 0.04 inches) and have small bristles that facilitate their dispersal (McMinn 1939). Establishment from seed occurs on newly exposed, damp alluvial soils. Once established, arrowweed spreads laterally by underground rhizomes, forming continuous stands that tend to inhibit the establishment of other riparian species and remaining dominant in the absence of disturbance. Arrowweed shoots withstand moderate flooding, and although they are unable to withstand strong scouring from floods, they recolonize open alluvial deposits readily by resprouting from roots and buried stems (Stromberg et al. 1991). Arrowweed survives at greater water table depths and tolerates greater soil salinities than Fremont cottonwood or Goodding's willow (Ohmart et al. 1988, Busch and Smith 1995). As a result, it has replaced cottonwood-willow vegetation in some areas that are subject to groundwater pumping (Holland 1986). However, it has been displaced by saltcedar in other areas (Turner and Karpiscak 1980).

Arrowweed dominates the area behind Laguna Dam and is the most prolific land cover category present.

Backwater This land cover type includes all areas of open water not associated with the active river channel with little to no emergent vegetation. Under existing conditions, backwaters include oxbow lakes, abandoned river channel pools, floodplain ponds and lakes, secondary river channel pools, and hydrologically isolated coves on reservoirs. Backwaters may be remnant features historically created by river processes or may be man-made. Backwaters may be permanent or temporary, drying completely during some seasons or years. Connections with the river may be open or in various degrees of closure, connected to the river by culverts, weirs, porous dikes, and groundwater. They can vary in size from less than 1 acre to more than 100 acres.

Marsh Marsh vegetation, typically emergent non-woody plants, occurs in areas of prolonged inundation. Historically, it was found along oxbow lakes and in backwater areas along the Colorado River. Today, it also occurs around relatively stable reservoirs, such as Laguna Reservoir, that have minimal daily and annual fluctuations in water level (Ohmart et al. 1988, D. Brown 1994). The most common components of this association are cattail (*Typha latifolia*, bulrush or tule (generally *Scirpus californicus*), and common reed (*Phragmites australis*); however, this community also includes open water, sandbars, and mudflats formed when the Colorado River is low. Cattails occur in shallow water up to 3 feet deep and are found on sloping, generally stable substrates. Bulrushes can grow adjacent to cattails but also in deeper water, up to five feet, and can extend as high as 10 feet above the surface. Riparian scrub species such as saltcedar and arrowweed are also common components of the marsh community at the upper elevation limits of the marsh.

In the vicinity of the project area, this community ranges from nearly 100 percent cattail/bulrush with small amounts of common reed and open water, to more sparse versions with few trees and grasses interspersed, as well as nearly solid cover of common reed with little open surface.

Saltcedar The saltcedar land cover type is dominated by nearly monotypic stands of saltcedar that are less than 16-feet tall, comprising approximately 80 to 100 percent of the total trees in this category, with the ground layer typically sparse. Because of its pervasive nature, saltcedar is found interspersed within every other riparian land cover type. Saltcedar is the common name

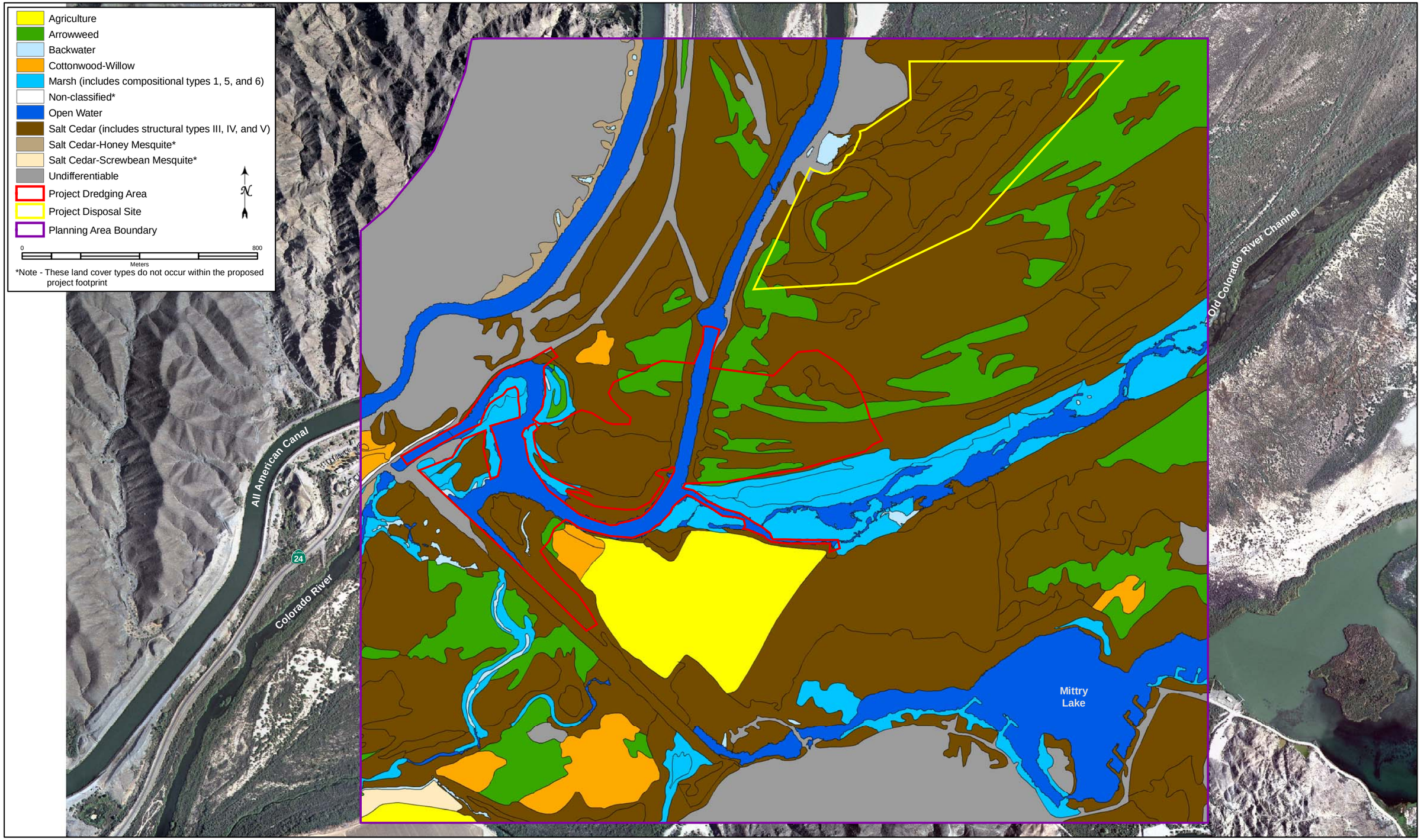

Figure 3-1. Land Cover Types in the Vicinity of the Proposed Project Area

applied to several nonnative species of shrubs to medium-size trees of the genus *Tamarix* that have aggressively displaced native riparian vegetation along the Colorado River. The most commonly invasive species are *Tamarix chinensis, T. parviflora,* and *T. ramosissima*. The related "athel," a larger tree that has been widely planted along the Colorado River, may also be included in areas mapped as saltcedar. This association generally occurs as a monoculture of saltcedar shrubs or trees. Saltcedar generally occurs in sandy or gravelly braided washes, streams, or ditches, or along the banks of rivers or lakes, often in areas where high evaporation increases soil salinity. Saltcedar is also a prolific seeder and, although the seed remains viable for only a few weeks, it is produced over a long period (March through October) relative to native riparian species. The seeds are minute and readily dispersed long distances by wind and water (DeLoach et al. 2000; Lovich 2000). Germination and establishment occur on open sites where soil moisture is high for a prolonged period. Saltcedar growth is extremely rapid and tends to preclude the establishment of native riparian species on such sites (Ohmart et al. 1988; Lovich 2000). Once established, saltcedar persists to the exclusion of native riparian species because it promotes conditions that it tolerates better than the native species. Saltcedar takes up and excretes salts, increasing soil salinity, and it increases fire frequency by producing large amounts of litter (DeLoach et al. 2000).

Cottonwood/Willow The cottonwood-willow plant community is made up of winter-deciduous trees that reach about 60 feet in height (Holland 1986; Rowlands et al. 1995). Fremont cottonwood (*Populus fremontii*) and Goodding's willow (*Salix gooddingii*) are the dominant tree species, although other species of willows may be present as well; and willows are usually more abundant than cottonwoods. The trees form a closed to open canopy with a variable understory on deep, well-watered, loamy alluvial soils on floodplains of the Colorado River and its major tributaries (Holland 1986). This plant community requires periodic winter or spring flooding to create new silt beds for cottonwood and willow seed germination, and the dominant trees do not tolerate permanent inundation (Ohmart et al. 1988, Brown 1994). As a result of flow stabilization, stands of the cottonwood-willow community remaining along the Colorado River are primarily decadent and show little evidence of seedling recruitment (Brown 1994).

This type occurs only negligibly (0.02 acre) within the footprint of Alternative 2.

Open Water This land cover type includes all areas of open water associated with the active river channel, including reservoir pools and backwaters.

Other Land Cover Types Other land cover types in the vicinity of the project area include undifferentiable areas, which are upland areas that support no major plant community and are generally bare ground, yet undeveloped. Agricultural fields also occur east of the project area

3.3.1.3 Wildlife

This section of the Colorado River supports numerous species of wildlife (birds, mammals, fish, reptiles, and amphibians), including both resident species and migratory visitors. Woody riparian vegetation and uplands and, to some extent, agriculture provide habitat for common mammals such as mule deer (*Odocoileus hemionus*), burro (*Equus asinus*) (a non-native mammal), coyote (*Canis latrans*), bobcat (*Felis rufus*), Audubon cottontail (*Sylvilagus*

audubonii), several species of rodents and bats, striped skunk (*Mephitis mephitis*), and raccoon (*Procyon lotor*) (Anderson and Ohmart 1984b).

The Colorado River corridor also provides important habitat for migratory birds, both upland species and waterfowl, as well as habitat for resident species. Woody riparian vegetation and wetlands provide habitat for a variety of raptors that include sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), rough-legged hawk (*Buteo lagopus johannis*), common blackhawk (*Buteogallus anthracinus*), Harris' hawk (*Parabuteo unicinctus*), bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), white-tailed kite (*Elanus leucurus*), American kestrel (*Falco sparverius*), and peregrine falcon (*Falco peregrinus*). Other common birds include egrets, herons, flycatchers, and woodpeckers. Backwaters and reservoirs provide resting and foraging habitat for waterfowl and shorebirds.

Reptiles and amphibians are represented by several species of lizards, snakes, toads, and frogs, many of which are native to the area. Most of these use upland and riparian areas, but the amphibians require water for reproduction. Two native fish inhabit the Lower Colorado River including razorback sucker (*Xyrauchen texanus*) and bonytail (*Gila elegans*), along with at least 23 non-native fish species introduced into the river in California (LCR MSCP 2004b). No native fish are known to be present within the project area, south of Imperial Dam.

Sensitive wildlife are described in section 3.3.1.6.

3.3.1.4 Fisheries

Native fish are not known to occur within the project area. However, several species of non-native sport fish are likely using open water and fringe wetlands for hunting, cover, and rearing. Sport fishing opportunities are present within and in the vicinity of the project area at Betty's Kitchen, Mittry Lake, and other areas along the Lower Colorado River. Non-native sport fish that may be present include largemouth bass, crappie, sunfish, channel catfish, flathead catfish, striped bass, and tilapia (Arizona Game and Fish Department 2005).

3.3.1.5 Wetlands and Other Waters of the United States

Activities in waters of the U.S. and navigable waters are regulated by the USACE under Section 404 Clean Water Act and Section 10 Rivers and Harbors Act. Non-tidal waters of the U.S. include all waters used or with potential to be used in interstate commerce up to the ordinary high water and associated wetlands. Wetlands are specific types of waters of the U.S. identified as special aquatic sites. Wetlands and other waters of the U.S. were delineated at the project site by SWCA Environmental Consultants (SWCA 2002). For the purposes of analysis and context, the planning area for wetlands are based on those areas mapped and delineated by SWCA (2002). Figure 3-2 presents wetlands and other waters of the U.S. within the planning area, and Table 3-7 provides a summary of the extent of these resources. Wetlands and other waters of the U.S. were identified and delineated in the vicinity of the project area based on the USACE 1987 delineation manual (Environmental Laboratory 1987) and verified by USACE. Wetland delineation forms and a detailed description of the sampling method are included in SWCA (2002).

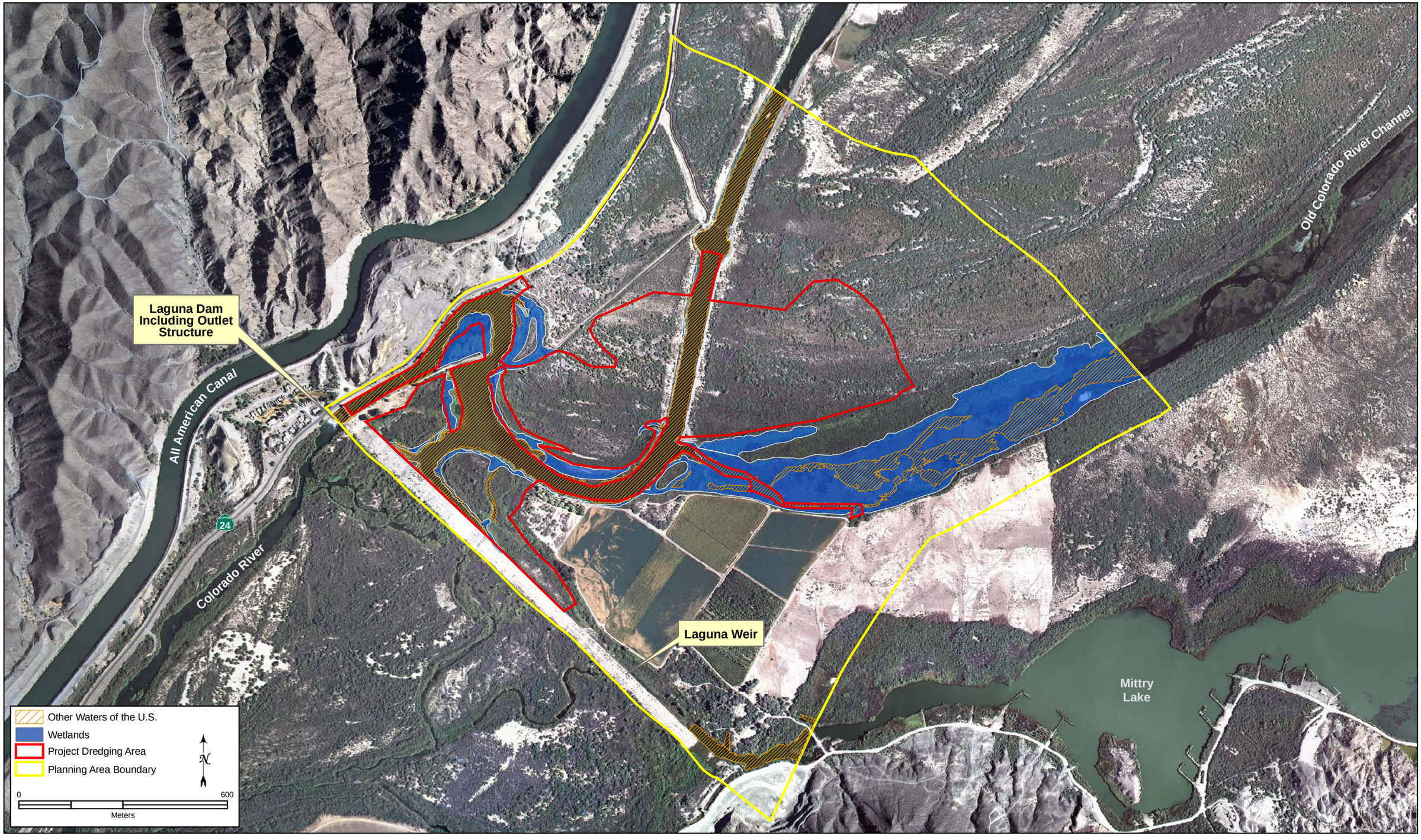

Figure 3-2. Wetlands and Other Waters of the U.S. in the Vicinity of the Proposed Action

Table 3-7. Waters of the U.S. in the Vicinity of the Proposed Action*

Type	*Area (acres)*
Other waters of U.S.	55.1
Wetlands	74.4
Total	**129.4**
*Wetlands were mapped by SWCA (2002), and values represent mapped area in Figure 3.3-2	

Jurisdictional wetlands within the project area are generally dominated by cattail, phragmites (also called common reed), and bulrush marsh communities adjacent to the present and old Colorado River channels. More limited areas of these wetlands support saltcedar, arrowweed, and coyote willow as dominant cover.

3.3.1.6 Rare, Threatened, Endangered, and Sensitive Species

This section presents sensitive, rare, threatened, and endangered species having the potential to occur in the vicinity of the project area based on the availability of suitable habitat and/or known occurrences. As described in the biological and conference opinion, two federally listed species have the potential to occur within the project area: Yuma clapper rail (*Rallus longirostris yumanensis*), and southwestern willow flycatcher (*Empidonax trailii extimus*). All rare, threatened, endangered, and sensitive species potentially present in the vicinity of the project area are presented in Table 3-8. Federally listed species having the potential to occur within the project area are described in more detail below, including status of the species and presence within the project area.

Several other federally listed species are known to other reaches of the river, but are not evaluated as part of this project due to lack of suitable habitat and/or historic records. The desert tortoise (*Gopherus agassizii*) occurs in creosote dominated desert scrub habitats, and no suitable habitat or designated critical habitat occurs within the project area. No native fish are known to occur within this section of the river (LCR MSCP 2004c). The yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is a federal candidate for listing and has been recorded in the general project vicinity (LCR MSCP 2004c). The cuckoo is typically associated with large stands of mature willow-dominated riparian habitat. Although the proposed action would result in a loss of 0.02 acre of willow woodland, impacts to this species are not expected due to the small size of the disturbance and the fact that this habitat is not associated with a large stand of mature willow riparian.

The bald eagle (*Haliaeetus leucocephalus*) also has the potential to occur within the project area. The bald eagle is considered a rare to uncommon visitor to the Lower Colorado River, with the nearest confirmed breeding habitats along the Bill Williams River near Alamo Dam in Arizona. Within the project area, use by this species would likely be limited to foraging in open water and limited upland areas. The proposed action is not likely to affect this species, with the exception of increasing areas suitable for open water foraging, which would be beneficial. As a result, this species is not evaluated further.

Table 3-8. Rare, Threatened, Endangered, and Sensitive Species Having the Potential to Occur within the Project Area*.

Common and Scientific Name	*Federal Status[1]*	*California Status*	*Notes*
Yuma hispid cotton rat *Sigmodon hispidus eremicus*	—	CSC	Moist grassy areas or brushy areas along river
Cooper's hawk *Accipiter cooperi*	—	CSC	Common, winter; forages primarily in riparian woodlands
Yuma clapper rail *Rallus longirostris yumanensis*	FE	CT	Generally in marshes with water <12"
California black rail *Laterallus jamaicensis coturniculus*	—	CT	Bulrush marsh with shallow water
Yellow-billed cuckoo *Coccyzus americanus*	FC	CE	Generally in mature CW forest
Gila woodpecker *Melanerpes uropygialis*	—	CE	Tall trees; nest in snags
Southwestern willow flycatcher *Empidonax traillii extimus*	FE	CE	Dense riparian vegetation close to ground with water or moist soil
Vermilion flycatcher *Pyrocephalus rubinus*	—	CSC	Cottonwood/willow with mesquite, open water and pasture nearby
Arizona Bell's vireo *Vireo bellii arizonae*	—	CE	Cottonwood/willow and mesquite; forage in dense riparian vegetation
Sonoran yellow warbler *Dendroica petechia sonorana*	—	CSC	Nest in wet deciduous thickets of saltcedar or Cottonwood/willow
Western least bittern *Ixobrychus exilis hesperis*	—	CSC	Dense, freshwater cattail- or bulrush-dominated marshes
Bald eagle *Haliaeetus leucocephalus*	FT/FPD	CE	Forages within a variety of aquatic open water habitats
Summer tanager *Piranga rubra*	—	CSC	Nest in cottonwood/willow or saltcedar; forage in top of trees

1. Federal: FC-Federal Species of Concern; FE-Federally Endangered; FT-Federally Threatened; FPD-Federally Proposed for Delisting.
State of California: CSC-California Species of Concern; CT-California Threatened; CE-California Endangered.

* Species list derived from LCR MSCP 2004b, c; CNDDB 2005; SWCA 2004.

Yuma Clapper Rail The Yuma clapper rail was listed as an endangered species on March 11, 1967, under legislation enacted in 1966 (Public Law 89-669). Only populations in the U.S. were listed, and those in Mexico were not. There is no critical habitat for the species. The Yuma Clapper Rail Recovery Plan (USFWS 1983) was signed in 1983 and the Yuma clapper rail is protected under the MBTA.

The Yuma clapper rail is a marsh bird found in dense cattail or cattail-bulrush marshes along the Lower Colorado River from the Southerly International Boundary to the lower Muddy River in Nevada and to the Virgin River in Utah above those rivers' confluence with Lake Mead. Significant populations are found in the Imperial Valley near and around the Salton Sea in California, and along the lower Gila River and Phoenix Metropolitan area in Arizona. The

populations in Mexico are found along the Lower Colorado River in the delta, marshes associated with tributaries to the Lower Colorado River, and the Cienega de Santa Clara (Hinojosa-Huerta *et al*. 2000). Survey detections for the U.S. habitats have fluctuated between 467 and 809 over the last 10 years (USFWS 2005). Those figures represent birds counted, and are not statistical population estimates. The population in Mexico was estimated statistically at 6,300 birds in 2000 (Hinojosa-Huerta et al. 2001), but declined to 4,850 by 2002, likely due to overgrowth of cattails (Hinojosa-Huerta et al. 2003). Changes in water flow between 2002-2003 improved habitat quality and counts of rails increased.

Yuma clapper rails may be somewhat migratory, although the extent to which birds move seasonally is not known. They are capable of significant movements, and dispersal away from existing population centers is a source of individuals to augment or initiate outlier populations. Life history information for the species is summarized in the Recovery Plan (USFWS 1983) and other papers (Todd 1986, Eddleman 1989).

Threats to the Yuma clapper rail population in the U.S. include the loss of marsh habitats to channelization or other river maintenance, lack of long-term management of existing marshes to maintain their suitability as habitat, lack of protection for habitat areas related to land ownership and water supply issues, and the presence of environmental contaminants such as selenium in the Lower Colorado River and Salton Sea.

The Yuma clapper rail is known to occur in the project vicinity, including the old river channel (AGFD and BLM annual survey data).

Southwestern Willow Flycatcher The southwestern willow flycatcher (*Empidonax traillii extimus*) was federally listed as an endangered species by the USFWS on 27 February 1995 (USFWS 1995). Critical habitat was designated for the species on October 19, 2005 (50 CFR § 17). No critical habitat for this species has been designated along the Lower Colorado River. A final recovery plan has been published.

The southwestern willow flycatcher is a neotropical migrant. It arrives in breeding habitat as early as mid-May and may be present until mid-August. The breeding range of this flycatcher extends from southern California, east to western Texas, north to extreme southern Utah and Nevada, and south to extreme northern Baja California del Norte and Sonora (Unitt 1984). Migration routes and wintering range for the southwestern willow flycatcher are not well known; it is thought that this species winters in Mexico, Central America, and perhaps northern South America. In the last 50 years, the southwestern willow flycatcher has declined precipitously. Since 1992, more than 800 historic and new locations have been surveyed range wide to document the status of the species.

The southwestern willow flycatcher inhabits riparian areas along rivers, streams, and other wetlands. It nests in typically even-aged, structurally homogeneous, dense stands of trees and shrubs approximately 13-23 feet (4 to 7 meters) tall with a high percentage of canopy cover and dense foliage from 0-13 feet (0 to 4 meters) above the ground (Brown 1988) often near standing water (Zeiner et al. 1990). Historic breeding records and museum collections indicate a sizable population of southwestern willow flycatchers may have existed along the extreme southern

stretches of the Lower Colorado River region (Unitt 1987). SWCA Environmental Consultants performed southwestern willow flycatcher surveys throughout 2003 (SWCA 2004).

In the vicinity of the project area, the closest 2003 observed southwestern willow flycatcher locations are approximately one-half mile east of the site around Mittry Lake, and north of the site approximately two miles. Historic locations also exist approximately one mile east associated with Mittry Lake (SWCA 2003). The Mittry Lake site was dominated by dense canopy saltcedar bordered by cattail and bulrush marsh to the south and upland disturbed areas to the north (SWCA 2003). No historic or current sitings within the project area were identified as part of the 2003 reporting.

3.3.2 Environmental Consequences and Mitigation Measures

Impacts on biological resources are considered significant if they could result in:

- substantial reduction in vegetative communities and the wildlife habitats they support;
- permanent reduction in the regional extent of wetlands;
- substantial direct loss or disturbance of wildlife; or
- permanent loss of habitat for rare, threatened, and endangered species.

3.3.2.1 Alternative 1 — Proposed Action

Environmental Consequences

Vegetation and Wildlife Habitat Table 3-9 presents land cover types within the footprint of the proposed action. Under this alternative, approximately 116.6 acres of vegetation would be lost (does not include open water habitats to be deepened [33.8 acres]) as a result of dredging operations. The loss of vegetation represents a decrease in nesting and foraging habitat for numerous common and sensitive wildlife species associated with the Colorado River.

The most abundant vegetation type within the project area, saltcedar (approximately 89.3 acres), is a non-native community that occurs throughout the Lower Colorado River area and is a target community for restoration to native habitats. Saltcedar also dominates the existing dredge material disposal area where project-related materials would be disposed. Although this type provides some habitat value for generalist wildlife species, it is considered a low-value habitat for sensitive species known to the area and of no value to southwestern willow flycatcher due to dry surface soil conditions at the project site (LC MSCP, 2004c). As a general rule, southwestern willow flycatcher nests are rarely more than a few dozen meters away from water or saturated soils (Sogge and Marshall 2000). The loss of 89.3 acres of saltcedar would represent only a negligible fraction (about 1.4% of the total saltcedar land cover type between Imperial Dam and Yuma and about 0.15% of the total saltcedar land cover type on the lower Colorado River) of this land cover type in the project vicinity, which is invasively expanding within and adjacent to the project area.

Table 3-9. Land Cover Types Within the Project Footprint

Community Type	*Alternative 1 (Proposed Action)*	*Alternative 2*	*Alternative 3*
Proposed Dredge Areas	**Extent in Acres**		
Arrowweed	20.5	42.1	18.9
Backwater	0.6	0.7	0.7
Marsh (includes compositional types 1, 5, and 6)[1]	5.9	14.4	14.4
Open Water	33.8	33.9	33.9
Saltcedar-III (includes structural types III, IV, and V)[1]	89.3	186.9	78.8
Cottonwood/Willow[2]	-	<0.1	-
Undifferentiated	0.3	0.6	0.5
Total	**150.4**	**278.7**	**147.2**
Proposed Dredge Disposal Area			
Arrowweed	8.2	73.1	8.2
Saltcedar	107.8	189.6	107.8
Undifferentiated	0.2	0.2	0.2
Total	**116.2**	**262.9**	**116.2**
Grand Total	**266.6**	**541.6**	**263.4**

***Source*: Reclamation GIS data (**Reclamation 2005d)

1. Extent of marsh is based on regional land cover GIS from Reclamation and does not represent a jurisdictional wetland delineation (see table 3.3-5 for jurisdictional wetland impacts). Marsh compositional types and saltcedar structural types follow LCR MSCP (2004b).
2. Value within project footprint less than 0.1 acre.

Similar to saltcedar, the loss of arrowweed and marsh habitats (approximately 20.5 acres and 5.9 acres respectively), would represent only a small fraction of comparable types present both north and south of the project area. Thousands of acres of these land cover types are presently associated with the Lower Colorado River. As a result of dredging, the loss of vegetation would be replaced by open water habitat, which would provide foraging habitat for some of the species and increase habitat for many additional species currently present within the project area.

Although the project would reduce the amount of vegetation present (and habitat), losses would not represent a substantial reduction in land cover types present in the vicinity of the project area. Therefore, impacts are less than significant. Impacts on sensitive wildlife species and sensitive habitat are evaluated under *Rare, Threatened, Endangered, and Sensitive Species.*

Wildlife Impacts on wildlife would include direct impacts associated with loss of habitat as well as indirect and temporary impacts associated with dredging and disposal (related to both replacing storage capacity and future maintenance dredging). Permanent loss of habitat would also affect wildlife species in the area, resulting in the loss of cover, foraging, and nesting habitat. Approximately 116.6 acres (total area within the project footprint [150.4 ac.] minus existing open water habitats [33.8 ac.]) of habitat would be converted from upland and wetland communities to open water as a result of dredging activities. An additional 116.0 acres of saltcedar and arrowweed land cover types would potentially be lost as a result of disturbance associated with the dredge disposal area. Vegetation within the disposal area is expected to return to the same cover type within a short period of time; however, some areas would be

periodically disturbed by the disposal of dredge material from future maintenance dredging. The increase in open water would provide additional foraging habitat, particularly for bird species in the area; however, cover and nesting areas would be reduced. The proposed action would result in the loss of habitat within the project area; however, as noted above, all community types are abundant in the vicinity and the loss would represent only a small fraction of suitable habitat in the area and are of the lowest quality habitat available in the project area (McKernan and Braden 2001). In addition, measures implemented under in the LCR MSCP to improve habitats along the LCR MSCP would reduce the level of impact associated with the proposed action. Therefore, the effects on wildlife of the loss of habitat that could result with implementation of the proposed action would be less than significant.

Temporary impacts including noise associated with dredging, increased human presence and other project-related activity would decrease the value of adjacent habitats and reduce the ability of wildlife to forage and nest in the area. These effects would be temporary, would cease when the project is completed, and are concentrated in the non-native habitats which typically provide less habitat value. Maintenance dredging would occur only in those areas previously dredged to maintain the proposed storage capacity and would result in temporary periodic disturbances (generally every 10 years; but could be as often as every 4 years) within the dredge area and the dredge disposal area. Some of the functional value of the habitat would return after the conversion to open water habitat allowing many species of wildlife to return to the area. As a result of the temporary nature of the proposed action and the likelihood that wildlife would return to the area when the project is complete, impacts resulting from project-related activities would be less than significant.

The proposed action could also affect common and sensitive wildlife as a result of grubbing vegetation in areas to be dredged, and disposal of sediment in the existing disposal area. Loss of individuals would be greatest if vegetation clearing components of the proposed action occur during the breeding season of migratory and resident birds. However, Avoidance and Minimization Measures (AMM) presented in the LCR MSCP require that all surface clearing activities occur outside of the breeding season of sensitive wildlife species, and minimize impacts on covered species habitats as noted below (AMM3, AMM6 [LCR MSCP 2004b]).

- *AMM3—To the extent practicable, avoid and minimize disturbance of covered bird species during the breeding season.* To the extent practicable, to avoid and minimize potential impacts on covered bird species, vegetation management activities (e.g., periodic removal of emergent vegetation to maintain canals and drains) associated with implementation of covered activities and the LCR MSCP that could result in disturbance to covered bird species will not be implemented during the breeding season to prevent injury or mortality of eggs and young birds unable to avoid these activities.
- *AMM6—Avoid or minimize impacts on covered species habitats during dredging, bank stabilization activities, and other river management activities.* To the extent practicable, before initiating activities involved with river maintenance projects, measures will be identified and implemented that avoid or minimize take of covered species where such activities could otherwise result in take. Such measures could include alternative methods to achieve project goals, timing of activities, pre-activity surveys, and minimizing the area of effect, including offsite direct and indirect effects (e.g., avoiding

or minimizing the need to place dredge spoil and discharge lines in covered species habitats; placing dredge spoils in a manner that will not affect covered species habitats).

Non-breeding individuals would likely disperse in response to noise and equipment, reducing some of the potential adverse effects on these wildlife. Therefore, impacts that could result in the loss or disturbance of wildlife with implementation of the proposed action would be less than significant.

Aquatic Habitats and Biota. The proposed action involves dredging activities in approximately 39.6 acres of waters of the U.S., including 7.2 acres of jurisdictional wetlands (Table 3-10).

Table 3-10. Waters of the U.S. Affected by the Proposed Action (acres)[1]

	ALTERNATIVE 1 (PROPOSED ACTION)		ALTERNATIVE 2		ALTERNATIVE 3	
Type	***Impacts***	***Created Area***	***Impacts***	***Created Area***	***Impacts***	***Created Area***
Open Water	32.4 (deepened)	113.4	34.1 (deepened)	245.5	34.0 (deepened)	113.3
Wetlands	7.2 (removed)	3.2	16.0 (removed)	0	16.1 (removed)	0
Total Waters of the U.S.	39.6	116.6	50.1	245.5	50.1	113.3

1. Values based on GIS data from verified wetlands delineation (SWCA 2002).

The proposed action has been designed to avoid and minimize impacts on wetlands through a reduced dredging area footprint in wetlands and the location of dredging predominately in upland areas. The Project would result in creation of approximately 116.6 acres of new open water habitat with fringing wetlands (Table 3-10). The 7.2 acres of wetlands expected to be removed by the proposed action are predominately marsh habitats dominated by bulrush, cattail, and phragmites. The ecological functions primarily provided by these wetlands are wildlife habitat and silt stabilization (entrapment).

As noted above, the proposed action would include the creation of approximately 116.6 acres of new open water and fringing wetlands habitat. An increase in open water habitat may induce additional erosion potential, resulting from increase wave action (resulting from larger surface area of open water and increased recreational opportunities in the area). No data exists to determine if additional surface area and/or increased recreational use of the area would substantially increase wave action and result in adverse effects on fringe communities. Water levels associated with operations would continue to remain within historic levels. In addition, this area will likely be maintained as a "no wake" or regulated recreation area to further reduce the potential effects on fringe communities. Open water habitat would continue and improve functional use for many aquatic species that forage in open water areas. Open water habitat would also be improved for sportfishes (non-native fish) and game in the vicinity of the project area.

The Project, including the disposal of dredge material at the existing disposal area, is a covered activity under the LCR MSCP and accompanying biological and conference opinion for Federal

covered actions. The LCR MSCP is an authorized and permitted conservation program under the ESA and CESA. The LCR MSCP provides for the conservation of habitat that offsets the habitat impacts of all covered activities, including the Project, and contributes to the recovery of various endangered and threatened species of fish, wildlife, and plants. The LCR MSCP provides for mitigation of the loss of all marsh habitat affected by covered activities under the final Biological Opinion (USFWS 2005).

The LCR MSCP marsh types essentially encompass the Section 404 jurisdictional wetlands at the Project site and the LCR MSCP provides for full mitigation of impacts on marsh habitat, including additional marsh habitat creation to contribute the recovery of the endangered Yuma clapper rail and to help preclude the listing of other sensitive species.

Under the Proposed Action, a total of 7.22 acres of marsh wetlands would be established to compensate for the loss of 7.22 acres of marsh wetlands. Mitigation of impacts of the Proposed Action on wetlands would be achieved through:

- avoidance measures included as part of the Proposed Project;
- planned natural wetland establishment of 3.23 acres within the expanded Laguna Reservoir;
- restoration of wetlands for a net gain of 2.00 acres within expanded ponds at the Imperial National Wildlife Refuge (NWR); and
- creation of 1.99 acres of wetlands in an upland area at the Imperial NWR.

With incorporation of project design components to avoid and minimize impacts on wetlands, the expansion of open water habitat within the project area, and compensatory mitigation for all marsh wetlands affected by the Proposed Action, impacts on aquatic areas and wetlands would be less than significant.

Rare, Threatened, Endangered, and Sensitive Species Two federally listed species, Yuma clapper rail and southwestern willow flycatcher, are known to occur in the vicinity of the project area. Project components, including temporary degradation of habitat from increased activity levels, direct loss of habitat, and potential mortality of individuals from grubbing of vegetation prior to dredging, all have the potential to result in the take of Yuma clapper rail. Yuma clapper rail is known to inhabit marsh and backwater areas associated with the existing and historic river channels. Increased noise levels and the presence of dredge equipment and human activity would temporarily degrade the quality of habitat in the area and potentially result in the abandonment of nest areas, decrease of nesting pairs, and/or decrease in reproductive success.

Although the specific level of take cannot be quantified, approximately 6.5 acres of habitat for this species (comprised of backwater and marsh habitat) would be removed as a result of the proposed action, and replaced with open water habitat. Loss of wet habitats would reduce the area available for future nesting and cover; however, as noted above, the proposed action has been designed to avoid the highest quality habitats and removal of surface vegetation associated with dredging would occur outside of the breeding season for the Yuma clapper rail.

Impacts on southwestern willow flycatcher would be similar to the Yuma clapper rail described above. In general, the southwestern willow flycatcher has the potential to occur in several

community types including riparian, saltcedar, and marsh areas; however, most of the area to be removed is not suitable for nest initiation (generally the saltcedar land cover type) because it does not have the potential to support surface water or saturated soils at least part time (SWCA 2002). Additionally, no potentially occupied habitat would be removed during the breeding season for the southwestern willow flycatcher, following AMM3 and AMM6 in the LCR MSCP (defined above).

This species has been observed east and north of the project area approximately one-half mile away at its closest point (Mittry lake area). As noted above, the project area is generally void of suitable riparian and nesting habitat; however, suitable roosting and foraging habitat does exist including saltcedar and marsh areas associated with existing and historic river channels. Approximately 6.5 acres of suitable habitat (marsh and backwater areas as presented in Table 3-9), and approximately 89.3 acres of additional lower quality habitat not suitable for nesting (saltcedar land cover type within the proposed dredge areas) would be removed as a result of the proposed action and replaced with open water habitat.

Other sensitive bird and wildlife species occurring within and adjacent to the project area would respond similarly to project activities.

As noted above, the proposed action, including the disposal of dredge material at the existing disposal location, is a covered activity under the LCR MSCP, which includes the creation and improvement of Yuma clapper rail and southwester willow flycatcher habitat all along the Lower Colorado River and is expected to result in an overall increase in the numbers and distribution of these species and other sensitive and common species protected by the MBTA, and contribute to the recovery of both Yuma clapper rail and southwestern willow flycatcher populations. The LCR MSCP Biological Assessment (LCR MSCP 2004c) and Biological Opinion (USFWS 2005) assessed the impacts and provided for mitigation and contribution to recovery for species listed, proposed for listing, and candidates for listing under ESA potentially affected by the Project, including Yuma clapper rail and southwestern willow flycatcher.

Conservation measures and policies presented in the LCR MSCP are currently in place and are not contingent upon the proposed action. Ongoing measures include maintenance of existing habitat; creation of new habitat; avoidance and minimization of impacts on habitat; and population enhancement of specific species including Yuma clapper rail and southwestern willow flycatcher; and monitoring, research, and adaptive management goals. The purpose of the LCR MSCP is to preemptively manage habitats and sensitive wildlife and resources along the Lower Colorado River in support of long term management goals. Specifically relevant to the proposed action are AMM3 and AMM6 (LCR MSCP 2004b), discussed above. With implementation of the LCR MSCP conservation measures, impacts of the proposed action on Yuma clapper rail, southwestern willow flycatcher, and other sensitive wildlife including those species protected under the MBTA, therefore, would be less than significant.

3.3.2.2 Alternative 2

Impacts under this alternative would be comparable but greater to those identified under the proposed action. Impacts on marsh wetland habitats and on sensitive and federally listed wildlife species would increase (loss of marsh habitat would increase from approximately 5.9 to 14.4

acres; arrowweed would increase from approximately 20.5 acres to 42.1 acres). This alternative would also increase total loss of saltcedar habitat from approximately 89.3 acres to 186.9 acres (see Table 3-9). Impacts on jurisdictional features would be similar but greater than the proposed action because of the additional loss of marsh habitat type.

This alternative would be considered a partially covered project under the LCR MSCP, and would benefit from existing measures in place including maintenance of existing habitat; creation of new habitat; avoidance and minimization of impacts on habitat; and population enhancement of specific species including Yuma clapper rail and southwestern willow flycatcher; and monitoring, research, and adaptive management goals. However, this alternative would result in adverse impacts greater than those for the proposed action and would require additional USFWS consultation beyond that required for covered projects under the LCR MSCP biological and conference opinion.

Because this alternative would be covered under the LCR MSCP, and with incorporation of the mitigation measure presented under the proposed alternative, impacts on vegetation and habitats, wildlife, aquatic communities, and sensitive species would be less than significant.

3.3.2.3 Alternative 3

This alternative would be the same as the proposed action without design components to reduce impacts on wetlands habitats so that loss of marsh areas would increase from 5.9 to 14.4 acres compared to the proposed action. All wetland areas within the footprint of this alternative would be removed. As a result, impacts on wetlands would be increased under this alternative compared to the proposed action. Because impacts on marsh areas would increase, impacts on sensitive species, including Yuma clapper rail, would also increase. This alternative would be considered a covered project under the LCR MSCP, and would benefit from existing measures in place including maintenance of existing habitat; creation of new habitat; avoidance and minimization of impacts on habitat; and population enhancement of specific species including Yuma clapper rail and southwestern willow flycatcher; and monitoring, research, and adaptive management goals.

Because this alternative would be covered under the LCR MSCP, and with incorporation of the mitigation measure presented under the proposed action, impacts on vegetation and habitats, wildlife, aquatic communities, and sensitive species would be less than significant.

3.3.2.4 No-Action Alternative

Under the No-Action Alternative, the proposed dredging activities would not occur. Open water habitat would continue to be reduced from sedimentation of the basin and the operational functionality of the reservoir, as well as the suitability of habitat for sport fishes, would continue to decrease until the entire basin fills with sediment. If complete sedimentation of the basin occurs, loss of aquatic and wetland communities and associated impacts on sensitive species and other wildlife would be significant. However, impacts on vegetation and habitat, wildlife, aquatic communities, and sensitive species resulting from dredging activities would not occur.

3.4 Cultural Resources

3.4.1 Affected Environment

Cultural resources are districts, buildings, sites, structures, areas of traditional use, or objects with historical, architectural, archeological, cultural, or scientific importance. They include archeological resources (both prehistoric and historic), historic architectural resources (physical properties, structures, or built items), and traditional cultural resources (those important to living Native Americans for religious, spiritual, ancestral, or traditional reasons). Traditional cultural resources and Native American consultations are discussed in section 3.10, Indian Trust Assets.

3.4.1.1 Regulatory Environment

The National Historic Preservation Act (NHPA) establishes national policy for protecting significant cultural resources that are defined as "historic properties" under 36 CFR 60.4. NHPA Section 106 (36 CFR §800) requires that federal agencies consider and evaluate the effect that federal projects may have on historic properties under their jurisdiction. Only significant cultural resources are considered for potential adverse impacts from a federal action.

3.4.1.2 Prehistoric and Historic Setting

The regional prehistoric cultural sequence can be divided into four periods – Paleoindian (San Dieguito), Archaic (Pinto and Amargosa), Late Prehistoric (Patayan), and Protohistoric. The earliest, well-documented prehistoric sites in the region are identified as belonging to the San Dieguito complex (approximately 12,000 to 7,000 years ago). The San Dieguito complex, which dates to late in the Paleoindian Period, is generally seen as representing small, mobile bands of hunters and gatherers with a hunting economy focused on large and small animals as well as collecting seasonally available wild plants. The Archaic Period (approximately 7,000 and 1,500 years ago) is differentiated from the earlier Paleoindian cultural complex by a shift to a more generalized economy and an increased focus on seed grinding and processing technology. The Patayan culture pattern along the lower Colorado River is marked by the introduction of pottery and floodplain agriculture approximately 1,200 years ago. By the time Native Americans came in contact with the Spanish, a variety of Native American groups were living along the lower Colorado River. Historically, the Quechan (also referred to as the Yuma Indians) occupied the project area.

Spanish explorers such as Francisco de Ulloa (1539), Francisco Vasquez de Coronado (1540), and Hernando de Alarcon (1540) led the earliest expeditions into the present day region of Yuma. Two missions were established near the Colorado and Gila River confluence and were later destroyed by the Quechan in the late-1700s. Fort Yuma was also established at the Colorado and Gila rivers confluence as people traveling to California from Mexico and other portions of the U.S. in the 1840s and 1850s passed through the area (Reclamation 2005c). Agriculture and associated irrigation facilities, like the Laguna Dam, played a significant role in the regional economy during the early-20th century. After the passage of the Reclamation Act in 1902, one of Reclamation's earliest initiatives was the Yuma Project, adopted in 1904. A key

element of this project was the construction of Laguna Dam to divert Colorado River water into canals for agricultural use.

3.4.1.3 Cultural Resources associated with the Project Area

A Class III cultural resource study was conducted for the Laguna Reservoir Expansion Project (Reclamation 2005c) to determine the presence or absence of potentially significant prehistoric and historic resources within the proposed dredging boundaries that might be considered a historic property under 36 CFR 60.4. This investigation consisted of a review of all relevant site records and reports on file with Arizona's Cultural Resource Inventory and the Southeastern Information Center of the California Historical Resource Information System, a pedestrian survey of the project area, and consultation with Native American representatives with possible knowledge of cultural resources in the project areas. No cultural resources were identified within the project area. Although visibility was poor in some areas, the study determined that the probability of encountering undocumented cultural resources within the project area is very low because the proposed dredging areas consist of accumulated sediment deposited during this century, especially since the construction of Imperial Dam in the 1930s (Reclamation 2005c). The State Historic Preservation Offices (SHPO) of California and Arizona have concurred with the findings of the Class III study on 6 January 2006 and 14 December 2005, respectively (see Appendix C).

The dredge spoil would be placed in an area previously analyzed by a Class II Cultural Resources Survey (Reclamation 1999). The area contained either recent sand deposits or impenetrable salt cedar vegetation. No cultural resources were identified in the proposed disposal area. In response to a request for consultation by Reclamation, California SHPO concluded that Reclamation took reasonable measures to identify historic properties in the area of potential effect, conducted the appropriate Native American consultation, and the Section 106 compliance efforts conform to applicable standards (Abeyta 1999). SHPO also noted Reclamation's previous stipulation for use of the disposal site, in lieu of a less than Class III survey of this area: *In the event of an inadvertent discovery of archaeological or historical cultural resources, all activity shall cease in the area of the discovery. Immediate telephone notification of the discovery shall be made to the Area Archaeologist or a responsible Federal Agency Official. In addition, all reasonable efforts to protect the cultural resources discovered shall be made. The Activity may resume only after the Federal Agency has authorized a continuance.* This stipulation would also apply to all Project-related activities.

Based on the Class II and III surveys described above, there are no archaeological resources within the project area. However, the Laguna Dam, itself, is eligible for listing on the National Register of Historic Places (NRHP) under the NHPA (Pfaff, Queen, and Clark 1999) and, therefore, qualifies as a historic property under 36 CFR 60.4. The dam is eligible as a stand-alone feature and as a contributing feature associated with Reclamation's historic Yuma Project. The SHPOs of California and Arizona have concurred with the eligibility determination of Laguna Dam. A Programmatic Agreement between Reclamation and SHPO is currently under development, which will cover NRHP-eligible features associated with the Yuma Project, including the Laguna Dam.

3.4.2 Environmental Consequences and Mitigation Measures

3.4.2.1 Alternative 1 — Proposed Action

Environmental Consequences Impacts on cultural resources are considered significant if a historic property, as defined under 36 CFR 60.4, would be physically damaged or altered, would be isolated from the context considered significant, or would be affected by project elements that would be out of character with the significant property or its setting.

There are no historic properties located within the proposed dredge or disposal areas. However, some of the proposed dredging would occur in close proximity to Laguna Dam, a cultural resource that has been determined eligible for listing on the NRHP. There is a large rubble block on the upstream side of the dam that is now covered with alluvium; this rubble block extends out about 38-feet from the crest of the dam. As described in Chapter 2, dredging operations near the dam would include a 50-foot buffer area from dam crest to dredge to ensure that no dam feature would be inadvertently impacted during dredging operations. The mitigation measure provided below would provide additional assurance that this historic property would not be affected by the proposed action.

Reclamation has submitted a determination of finding of no adverse affect to the California and Arizona SHPOs, in accordance with Section 106 of the NHPA, and they have concurred with this determination on 6 January 2006 and 14 December 2005, respectively.

Mitigation Measures With implementation of the following mitigation measure, potential impacts on the Laguna Dam would be avoided:

- Project activities within 100 feet of the Laguna Dam shall be monitored by an archeologist that meets the Secretary of the Interior's professional qualification standards for archeology.

The environmental consequences of implementation of habitat restoration under the LCR MSCP, including the specific wetlands restoration activities at the Imperial NWR, have been addressed in separate NEPA compliance documents, the LCR MSCP EIS (LCR MSCP 2004a) and the Lower Colorado River National Wildlife Refuges Comprehensive Management Plan EA (USFWS 1994), respectively.

3.4.2.2 Alternative 2

The environmental consequences would be the same as under the proposed action. With implementation of the mitigation measure provided for Alternative 1, impacts on cultural resources would be avoided.

3.4.2.3 Alternative 3

The environmental consequences would be the same as under the proposed action. With implementation of the mitigation measure provided for Alternative 1, impacts on cultural resources would be avoided.

3.4.2.4 No-Action Alternative

Under the No-Action Alternative, no dredging or sediment disposal activities would occur to clear vegetation growth near hydraulic features of the Laguna Dam. Under existing conditions, the historic integrity of the Laguna Dam could be impacted by further sedimentation and vegetation growth over time. For example, vegetation has the potential to affect the structural integrity of the weir and the gate structure's concrete outlet structure. Increased sedimentation under current conditions could lead to additional vegetation growth, which could lead to accelerated structural deterioration of features associated with the historic dam. If left unchecked, such deterioration could result in significant impacts on the Laguna Dam, a historic property under 36 CFR 60.4.

3.5 Environmental Justice

This section addresses the potential for the Project to create disproportionate impacts on minority and low-income populations.

3.5.1 Affected Environment

3.5.1.1 Regulatory Environment

In 1994, the president issued Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority and Low-income Populations. The objectives of the EO include developing Federal agency implementation strategies, identifying minority and low-income populations where proposed Federal actions could have disproportionately high and adverse human health and environmental impacts, and encouraging the participation of minority and low-income populations in the NEPA process. In addition, the CEQ issued Environmental Justice Guidance under NEPA (CEQ 1997).

3.5.1.2 Minority and Low-Income Populations

Minority populations include all persons identified by the Census of Population and Housing to be of Hispanic or Latino ethnicity, regardless of race, as well as non-Hispanic persons who are Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and persons of two or more races.

Low-income populations are those that fall within the statistical poverty thresholds from the Bureau of the Census for the 2000 Census. For the purposes of this analysis, low-income populations are defined as persons living below the poverty level ($17,463 for a family of four with two children in 2000, adjusted based on household size and number of children), as reported by the Census. The Census Bureau uses a set of income thresholds that vary by family size and composition. If the total income for a family or unrelated individual falls below the relevant poverty threshold, then the family or unrelated individual is classified as being "below the poverty level." The percentage of low-income persons is calculated as the percentage of all persons for whom the Bureau of the Census determines poverty status, which is generally a slightly lower number than the total population because it excludes institutionalized persons, persons in military group quarters and in college dormitories, and unrelated individuals under 15 years old.

Laguna Dam is located approximately 12 miles northeast of Yuma, Arizona, on the border of California and Arizona. The affected area includes the locations where the vast majority of the project effects are expected to occur including the Laguna Reservoir (specifically locations affected by the proposed dredging and related activities such as staging areas, dredge disposal sites) and nearby communities where workers are likely to reside. There are no residences in the immediate vicinity of the reservoir site; however, a small recreational trailer park is located on the opposite side of S-24. The affected area includes Imperial County, California, and Yuma County, Arizona, the City of El Centro in Imperial County and the City of Yuma in Yuma

County. Information on total population, minority population, and poverty status for the two counties and two cities is provided in Table 3-11 below.

Of the two counties, Imperial County has a higher percentage of both minority and low-income populations, at approximately 80 percent and 23 percent, respectively. The City of El Centro has similar characteristics; approximately 82 percent of the population is minority and 23 percent low-income. The population of Yuma County is approximately 56 percent minority and 19 percent low-income. The City of Yuma's population is approximately 53 percent minority and 15 percent low-income, slightly less than Yuma County.

Table 3-11. Total Population, Minority Population, and Population Living Below Poverty, 2000

County	*Total Population*	*Minority Population*	*Percent Minority*	*Population Living Below Poverty Level*	*Percent of Population Living Below Poverty Level*
Imperial County, CA	142,361	113,872	80.0	29,681	22.6
City of El Centro	37,835	30,998	81.9	8,405	22.8
Yuma County, AZ	160,026	88,896	55.6	29,670	19.2
City of Yuma	77,515	40,731	52.5	10,910	14.7

Note: Percent of population living below poverty is calculated taking by taking into consideration the population for whom poverty status is determined, a number that is generally less than the total population, because certain populations are excluded.
Source: U.S. Census Bureau 2000.

Reclamation has been consulting with the Quechan Indian tribe whose reservation, the Fort Yuma Indian Reservation, is located partially within and adjacent to the project area (see section 3.8, Indian Trust Assets and section 3.12, Socioeconomics). The 2000 Census reports that 83.2 percent of the population of the Reservation is minority and 33.9 percent is living below the poverty level. If the project results in more open water, this could, for example, increase revenues to the tribe for fishing and boating.

3.5.2 Environmental Consequences and Mitigation Measures

3.5.2.1 Alternative 1 — Proposed Action

Environmental Consequences As part of the Environmental Justice analysis, environmental consequences for other resources analyzed in Chapter 3 were reviewed, and no significant impacts to human populations were identified (e.g., noise, air quality, traffic). The proposed action would benefit system users of the Colorado River by improving operational flexibility and increasing storage behind Laguna Dam. Project-related expenditures for labor, materials, and services would benefit the local economy. Project dredging would last approximately three years, with periodic maintenance dredging approximately every four years thereafter. No significant impacts were identified for the proposed action that would adversely affect human populations or the public. The proposed action, therefore, would not result in disproportionately high and adverse human health and environmental effects on minority or low-income populations.

Mitigation Measures The proposed action would not result in disproportionately high and adverse human health and environmental effects on minority or low-income populations; therefore, no mitigation measures are identified.

The environmental consequences of implementation of habitat restoration under the LCR MSCP, including the specific wetlands restoration activities at the Imperial NWR, have been addressed in separate NEPA compliance documents, the LCR MSCP EIS (LCR MSCP 2004a) and the Lower Colorado River National Wildlife Refuges Comprehensive Management Plan EA (USFWS 1994), respectively.

3.5.2.2 Alternative 2

No significant impacts to human populations were identified for Alternative 2. Like the proposed action, this alternative would benefit system users of the Colorado River by improving operational flexibility, but would increase storage behind Laguna Dam to a greater extent than under the proposed action. Project-related expenditures for labor, materials, and services would benefit the local economy. No significant impacts were identified for Alternative 2 that would adversely affect human populations or the public. Alternative 2, therefore, would not result in disproportionately high and adverse human health and environmental effects on minority or low-income populations.

3.5.2.3 Alternative 3

No significant impacts to human populations were identified for Alternative 3. Like the proposed action, this alternative would benefit system users of the Colorado River by improving operational flexibility and would increase storage behind Laguna Dam creating the same overall reservoir capacity as the proposed action, but with additional wetland impacts. Project-related expenditures for labor, materials, and services would benefit the local economy. No significant impacts were identified for Alternative 3 that would adversely affect human populations or the public. Alternative 3, therefore, would not result in disproportionately high and adverse human health and environmental effects on minority or low-income populations.

3.5.2.4 No-Action Alternative

Under the No-Action Alternative, the sediment dredging and vegetation removal would not occur in Laguna Reservoir. As a result, the storage capacity behind the dam would remain at levels below its pre-1983 capacity. The No-Action Alternative, therefore, would not create benefits for system users of the Colorado River by improving operational flexibility and increasing storage behind Laguna Dam. No impacts were identified for the No-Action Alternative that would adversely affect human populations or the public.

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3.6 Hazards/Hazardous Materials

This section addresses potential impacts related to hazards and hazardous materials resulting from implementation of the proposed action and alternatives.

3.6.1 Affected Environment

3.6.1.1 Regulatory Environment

Generally speaking, "hazardous materials" means any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. Hazardous materials that are commonly found in soil and groundwater include petroleum products, fuel additives, heavy metals, and volatile organic compounds. If concentrations of certain contaminants in the soil or groundwater are high enough to exceed regulatory thresholds or other criteria established under California Code of Regulations (CCR) Title 22, Sections 66261.20 to 66261.24, the soil or groundwater would be classified as a "hazardous waste." Soil or groundwater that exhibits these criteria is classified as "characteristic" hazardous wastes.

Section 402 of the Clean Water Act (CWA) authorizes states to issue permits for discharges to surface waters from point sources and from non-point sources. This section of the CWA requires National Pollution Discharge Elimination System (NPDES) permits for (1) discharges of pollutants into waters of the U.S. or (2) discharge from projects that disturb one or more acres. Section 401 of the CWA requires that federally authorized discharges into waters of the U.S. not violate state water quality standards. If a permit under Section 402 of the CWA were needed, then a Certification of Conformance with water quality standards, pursuant to Section 401 of the CWA, would also be needed.

3.6.1.2 Hazards and Hazardous Materials within the Project Area

The project site is located in a rural area, adjacent to agricultural properties. No commercial or industrial properties, which might have used hazardous materials, are located in the vicinity of the site. An environmental database report, which identified all documented hazardous materials and petroleum storage or spills within one mile of the subject site, indicated that the closest site is the Imperial Irrigation District Imperial Dam Headquarters, located approximately 0.5 mile northeast of the site, at 2400 Imperial Road (Route 1 at Senator Wash Road). A leaking underground storage tank (UST) was discovered at this property in 1989; however, a site investigation indicated that groundwater was not impacted as a result of the spill (only localized soil impacts) and the case was closed on August 25, 1992 by the California Regional Water Quality Control Board (Environmental Data Resources [EDR], Inc. 2002). The project site is not located in any other type of hazard-prone area.

In addition, two USTs were present at Reclamation's Laguna Yard, located approximately one mile north of the proposed dredge site. No leaks have been reported from these USTs, which

have been upgraded periodically over the years to comply with current UST regulations. These tanks were removed in January 2006. Soil samples collected from the base of the tank excavation contained no detectable concentrations of petroleum hydrocarbons (personal communication, Mike Biever 2006).

3.6.2 Environmental Consequences and Mitigation Measures

3.6.2.1 Alternative 1 — Proposed Action

Environmental Consequences The project site is not located in proximity to any known or suspected hazardous waste or petroleum waste sites. The site is located in a rural area with no known historic commercial or industrial uses. Therefore, it is not anticipated that contaminated sediments would be encountered during dredging operations. However, incidental spills of petroleum products could occur during operation and maintenance of the dredge. In addition, incidental spills could occur from construction equipment and vehicles used during construction and operation of the disposal pipeline. Such spills could result in significant impacts to sediment and water quality.

Mitigation Measures There are potentially significant impacts related to incidental spills of petroleum products during construction and dredging operations. With implementation of the following mitigation measure, impacts related to hazardous materials would be less than significant:

- Pursuant to NPDES requirements, a Storm Water Pollution Prevention Plan (SWPPP) shall be in place prior to dredging and pipeline construction. The SWPPP shall include standard Best Management Practices (BMPs), such as temporary spill containment booms and absorbent pads, to be utilized in accordance with an established spill contingency plan.

The environmental consequences of implementation of habitat restoration under the LCR MSCP, including the specific wetlands restoration activities at the Imperial NWR, have been addressed in separate NEPA compliance documents, the LCR MSCP EIS (LCR MSCP 2004a) and the Lower Colorado River National Wildlife Refuges Comprehensive Management Plan EA (USFWS 1994), respectively.

3.6.2.2 Alternative 2

Impacts would be similar, but slightly greater, than those described for Alternative 1, as more dredging operations would be required, thus extending the potential time that incidental spills could occur. Impacts would be less than significant with implementation of the mitigation measure provided for Alternative 1.

3.6.2.3 Alternative 3

Impacts would be similar to those described for Alternative 2, as the amount of dredging would be similar. Impacts would be less than significant with implementation of the mitigation measure provided for Alternative 1.

3.6.2.4 No-Action Alternative

No impacts would occur with respect to hazards and hazardous materials, as no construction and operation related incidental spills of petroleum products would occur.

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3.7 Hydrology/Water Quality

This chapter discusses the potential change of water quality, reservoir elevation, and water management associated with the implementation of the proposed action and alternatives related to increased storage capacity at Laguna Reservoir. Sources of information for this section were the Preliminary Study of Lower Colorado River Storage Alternatives (Reclamation 2004), the Final Environmental Impact Statement Implementation Agreement, Inadvertent Overrun and Payback Policy, and Related Federal Actions (Reclamation 2002), a technical memorandum comparing Laguna Reservoir conditions in 1982 and 2003 (Brown and Caldwell 2006), and the Scoping Summary Report for the Laguna Restoration Project (Appendix A).

3.7.1 Affected Environment

The Colorado River Basin encompasses approximately 244,000 square miles located in portions of seven states (i.e., Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming – collectively referred to as the Basin States). The Colorado River starts in the Rocky Mountains and traverses more than 1,400 miles to its terminus in the delta region of the upper Gulf of California (Sea of Cortez) in Mexico. The Colorado River provides the water supply for over 25 million people and about 3.5 million acres of agricultural lands in the U.S. and Mexico (Water Education Foundation 2001). The Colorado River Compact of 1922 divided the Colorado River into Upper and Lower Divisions and Upper and Lower Basins. The Upper Division States are Colorado, New Mexico, Utah, and Wyoming, and the Lower Division States are Arizona, California, and Nevada. The Lower Basin extends from Lee Ferry to the Southerly International Boundary and is generally referred to as the Lower Colorado River.

Hydrologic conditions vary from year to year depending on a variety of factors, and a single year may not be representative of normal conditions. To better control and utilize waters of the Colorado River, multiple dams, powerplants, and diversion structures were constructed by the U.S. Government. The overall system has 10 major reservoirs that provide approximately 60 million acre-feet (maf) of water storage. The Lower Colorado River system includes Hoover, Davis, Parker, Headgate Rock, Palo Verde Diversion, Imperial, Laguna, and Morelos Dams. Hoover is the northern most dam and Morelos Dam is the last dam on the Colorado River and is located just below the U.S. at Mexico's Northerly International Boundary. Morelos Dam was constructed and is operated and maintained by the Republic of Mexico. Reclamation manages the water resources of the Colorado River, and operates the Lower Colorado River system to control floods, regulate the flow of the Colorado River, deliver stored water for beneficial uses in the U.S. and Mexico, and generate electrical energy, among other purposes.

The region of influence for the proposed action is Laguna Reservoir, which is behind Laguna Dam. Laguna Dam is approximately 12 miles northeast of Yuma, Arizona and five miles downstream from Imperial Dam, near the California and Arizona border. The Laguna Reservoir area lies on an existing floodplain of the Colorado River.

The sluicing flows facilitated by Laguna Reservoir are important to operations at upstream facilities, including Imperial Dam and desilting works, the California Sluiceway and the All-

American and Gila Gravity Main canals. The desilting works at Imperial Dam remove sediment from Colorado River water and prevent clogging, expensive and difficult maintenance, and outages of the All-American and Gila Gravity Main canals. Sediment collected by the Imperial desilting works, along with water to move it, is discharged into the California Sluiceway. As sediment collects in the sluiceway, it is moved 3,000 feet downstream to a sediment settling basin in Laguna Reservoir using high rate, short duration sluicing flows of 8,000 to 14,000 cubic feet per second (cfs) of approximately 20 minutes in duration. Sluicing flows arriving at Laguna Reservoir are stored behind Laguna Dam and are released over an extended period.

Historically, the Laguna Reservoir capacity was approximately 1,500 af, which has decreased over time due to sedimentation. The reservoir has not been dredged since the late 1970's. Capacity, therefore, has incrementally decreased over time, and the reservoir currently has a storage capacity of approximately 400 af. Water can be stored in Laguna Reservoir between water surface elevations of 140.5 feet to 151.3 feet mean sea level. The overflow weir at Laguna Dam is at 151.3 feet mean sea level (Reclamation 2004).

Laguna Reservoir is also one of many facilities used by Reclamation to make water deliveries to Mexico. Water deliveries to Mexico can also be made from Imperial Dam, through the All-American Canal, returning to the Colorado River at Pilot Knob; through the Yuma Main Canal; and from drains, wasteway flows, and Gila River flows.

3.7.1.1 Regulatory Environment

Reclamation is the lead agency for this EA. Though not subject to local and state regulations (except where local entities enforce federal law), Reclamation will coordinate environmental review, permitting, and construction activities with local and state authorities to avoid conflicts to the extent feasible.

- *Executive Order 11988, Floodplain Management, May 24, 1977.* This EO requires avoiding or minimizing harm associated with the occupancy or modification of a floodplain. The proposed action would involve the creation of backwaters or habitat within the historic floodplain of the area above Laguna Dam and would, therefore, minimize harm associated with the occupancy or modification of the floodplain, which is related to hydrology.
- *The Law of the River.* Lower Colorado River operations are determined by various laws, treaties, and court decisions collectively referred to as The Law of the River. The Law of the River encompasses discretionary and nondiscretionary actions by Reclamation, acting for the Secretary of the Interior as watermaster, related to its operation and maintenance of the Lower Colorado River.
- *The U.S.-Mexican Water Treaty of 1944.* Under Article 10(a) of the *Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande — Treaty between the United States of America and Mexico* dated February 3, 1944, Mexico is entitled to an annual amount of 1.5 maf of Colorado River water. Under Article 10(b) of the U.S.-Mexican Water Treaty of 1944, Mexico may schedule up to an additional 0.2 maf when "there exists a surplus of waters of the Colorado River in excess of the amount necessary to satisfy uses in the United States."

The proposed action could have impacts to water quality, as defined by the CWA. Water quality and CWA issues are also addressed in section 3.3 (Biological Resources), section 3.6 (Hazards/Hazardous Materials), and section 3.13 (Topography, Geology, Soils, and Mineral Resources).

3.7.2 Environmental Consequences and Mitigation Measures

3.7.2.1 Alternative 1 — Proposed Action

The proposed action would increase the amount of storage capacity in the Laguna Reservoir basin area located upstream of Laguna Dam through the excavation of accumulated sediments. The existing storage capacity available in the current reservoir is approximately 400 af. The proposed action would restore Laguna Reservoir's capacity to pre-1983 levels, or about 1,500 af of water storage capacity, through the removal of accumulated sediments in the basin area located immediately upstream of Laguna Dam. Increased capacity of the Laguna Reservoir would allow for more frequent sluicing operations from Imperial Dam, necessary to maintain proper operations of the outlet structure (California Sluiceway).

Impacts related to hydrology include changes to reservoir elevations, need for increased maintenance dredging, changes to water quality, and increased flexibility in meeting water deliveries to Mexico. The environmental consequences of implementation of habitat restoration under the LCR MSCP, including the specific wetlands restoration activities at the Imperial NWR, have been addressed in separate NEPA compliance documents, the LCR MSCP EIS (LCR MSCP 2004a) and the Lower Colorado River National Wildlife Refuges Comprehensive Management Plan EA (USFWS 1994), respectively.

Water Quality

Environmental Consequences During the three year dredging period, the proposed action could have potential impacts to water quality due to the potential for erosion during desilting operations. Similarly, future maintenance dredging could result in potentially significant water quality impacts related to erosion. These impacts are discussed in detail in section 3.13 (Topography, Geology, Soils, and Mineral Resources).

The proposed action would have no impacts on the chemical composition of the water at and below the Laguna Reservoir because the increase in storage capacity would have no impact on the composition of the water flowing into or out of the reservoir**.**

Mitigation Measures With implementation of the mitigation measure described in section 3.13 (Topography, Geology, Soils, and Mineral Resources), impacts to water quality related to erosion would be less than significant.

Reservoir Elevation

Environmental Consequences To estimate current conditions, year 2003 reservoir elevations were examined. In year 2003, reservoir elevations varied from 145.3 feet to 153.7 feet (water surface elevations above 151.3 feet indicate periods where Reclamation is surcharging the

reservoir and the water surface is above the top of the Laguna Dam weir. In year 2003 the water surface elevation in Laguna reservoir averaged 149.3 feet (Brown and Caldwell 2005, 2006). Under Alternative 1, the reservoir capacity would be returned to conditions similar to pre-1983. To estimate how this would affect reservoir elevations, pre-1983 water surface elevations were examined. In 1982, water surface elevations in Laguna reservoir varied from 141.2 feet to 151.8 feet, and averaged 148.6 feet (Brown and Caldwell 2005, 2006). Thus with implementation of Alternative 1, reservoir elevations could fluctuate to a new, lower minimum (141.2 feet as opposed to 145.3 feet under current conditions) and the average water elevation is anticipated to be lower, 148.6 feet rather than 149.3 feet. This potential change in average water surface elevation is not a significant impact. Reclamation has operational jurisdiction to operate the reservoir similar to what it has done in the past.

Under current operations, the elevation of Laguna reservoir is consistently rising and falling and is rarely static. Reservoir elevations may approach both a minimum level (145.3 feet under current conditions) and maximum level (153.7 feet) several times in any given month. Under Alternative 1, reservoir elevations would still fluctuate but the potential range of fluctuation would be somewhat greater. The range of reservoir fluctuation under Alternative 1 is within the historic operating levels for Laguna reservoir and is not a significant impact. The additional storage will allow the reservoir to accept additional sluicing water without having to as rapidly evacuate the reservoir in advance or quickly release water in anticipation of a future sluicing flows.

Mitigation Measures Because no significant impacts on reservoir elevation would occur as a result of implementation of the proposed action, no mitigation measures are proposed.

Water Management

Environmental Consequences The proposed action would be consistent with Reclamation's operations and maintenance responsibilities under the Law of the River. The proposed action would enhance Reclamation's ability to sluice water and maintain the California Sluiceway, as well as the desilting operations at Imperial Dam necessary for delivery of water into the All-American Canal and Gila Gravity Main Canal.

The proposed action would not impair Reclamation's ability to meet its obligations under the U.S.-Mexican Water Treaty of 1944. The proposed action would enhance the options by which Reclamation could deliver water to Mexico by increasing water available for delivery to Mexico from Laguna Reservoir.

Mitigation Measures Because no significant impacts on water management would occur as a result of implementation of the proposed action, no mitigation measures are proposed.

Hydroelectric Power The proposed action would have only a limited affect on hydroelectric power. Neither Imperial, Laguna, nor Morelos dams are equipped with hydroelectric facilities. Hence, a change in sluicing flows from Imperial Dam to Laguna Reservoir and any resulting changes in water deliveries from Laguna Dam to Morelos would be minimal and changes to hydroelectric power production would be minimal.

Mitigation Measures Because no significant impacts on hydroelectric power would occur as a result of implementation of the proposed action, no mitigation measures are proposed.

3.7.2.2 Alternative 2

Alternative 2 would have a beneficial impact to river flows, as it would allow for greater capacity of the Laguna Reservoir (2,800 af), and, therefore, would allow for proper maintenance of the Laguna outlet structure and would achieve more predictable downstream flows.

Water Quality As described in section 3.13 (Topography, Geology, Soils, and Mineral Resources), impacts to water quality would be similar, but slightly greater, than those described for the proposed action (Alternative 1), as more dredging and disposal operations would be required, thus extending the potential time for erosion-induced siltation of the reservoir and river. Impacts would be less than significant with implementation of the mitigation measure provided in section 3.13.

Reservoir Elevation Impacts to reservoir levels would be similar, but slightly greater, than those described for the proposed action (Alternative 1), as the increased storage capacity would allow for greater fluctuation in reservoir levels. As described earlier, under current conditions elevations vary from 145.3 feet to 153.7 feet and average 149.3 feet (Brown and Caldwell 2005, 2006). With storage capacity of 2,800 af, reservoir elevations could be drawn down to the minimum water storage level for Laguna reservoir, 140.5 feet. However, due to the greater storage in the reservoir under Alternative 2 less rapid fluctuations in reservoir elevation are anticipated than under current conditions or Alternative 1. The greater storage allow the reservoir to accept additional sluicing water without having to rapidly evacuate the reservoir in advance or quickly release water in anticipation of a future sluicing flows.

Water Management Alternative 2 would be consistent with Reclamation's operations and maintenance responsibilities under the Law of the River. Under Alternative 2, benefits to water management would be enhanced relative to the proposed action. Alternative 2 improves Reclamation's ability to sluice water and maintain the California Sluiceway, as well as the desilting operations at Imperial Dam that are necessary for delivery of water into the All-American Canal and Gila Gravity Main Canal. It also enhances the options by which Reclamation could deliver water to Mexico by increasing water available for delivery to Mexico from Laguna Reservoir.

Hydroelectric Power Impacts to hydroelectric power would be similar, but slightly greater, than those described for the proposed action, as the increased storage capacity could result in changes in the water being delivered to Mexico via Laguna Dam rather than via releases from Imperial Dam and the power production facilities of the All-American Canal.

3.7.2.3 Alternative 3

Alternative 3 would have the same beneficial impact to river flows as the proposed action. Alternative 3 would allow for greater capacity of the Laguna Reservoir (1,500 af), and, therefore, would allow for proper maintenance of the Laguna outlet structure and would achieve predictable downstream flows.

Water Quality Impacts to water quality would be similar to the proposed action (Alternative 1), as the amount of dredging would be similar. Impacts would be less than significant with implementation of the mitigation measure provided in section 3.13.

Reservoir Elevation Impacts to reservoir levels would be similar to those described for the proposed action (Alternative 1), as the amount of dredging and resulting storage capacity would be similar.

Water Management Alternative 3 would be consistent with Reclamation's operations and maintenance responsibilities under the Law of the River. Benefits to water management would be similar to those described for the proposed action (Alternative 1), as the amount of dredging and resulting storage capacity would be similar. Alternative 3 improves Reclamation's ability to sluice water and maintain the California Sluiceway, as well as the desilting operations at Imperial Dam that are necessary for delivery of water into the All-American Canal and Gila Gravity Main Canal. It also enhances the options by which Reclamation could deliver water to Mexico by increasing water available for delivery to Mexico from Laguna Reservoir.

Hydroelectric Power Impacts to hydroelectric power would be similar to those described for the proposed action (Alternative 1), as the amount of dredging and resulting storage capacity would be similar. Increased storage capacity could result in changes in the water being delivered to Mexico via Laguna Dam rather than via releases from Imperial Dam and the power production facilities of the All-American Canal.

3.7.2.3 No-Action Alternative

Under the No-Action Alternative, Laguna Reservoir would continue to receive sediment from upstream and the reservoir would continue to lose capacity. Loss in capacity would result in reduced capabilities of capturing sluicing flows, which would have a negative impact on the ability to maintain the California Sluiceway and desilting operations at Imperial Dam, hindering Reclamation's water management on the Lower Colorado River. This is a potentially significant impact, and would be inconsistent with the purpose and need of the project. The No-Action Alternative would result in no change to water quality or hydroelectric power generation.

3.8 Indian Trust Assets

3.8.1 Affected Environment

This section outlines potential impacts to tribal resources associated with the implementation of the proposed action. Tribal resources include all potential impacts to tribal lands and resources, including the specific category referred to as Indian Trust Assets (ITAs). ITAs are legal assets associated with rights or property held in trust by the U.S. for the benefit of federally recognized Indian Tribes or individuals. The U.S., as trustee, is responsible for protecting and maintaining rights reserved by, or granted to, Indian Tribes or individuals by treaties, statutes, and executive orders. All Federal bureaus and agencies share a duty to act responsibly to protect and maintain ITAs.

3.8.1.1 Regulatory Environment

In accordance with Environmental Compliance Memorandum (ECM) 97-2, Reclamation's policy is to protect ITAs from impacts resulting from its programs and activities whenever possible. Reclamation, in cooperation with Tribe(s) potentially impacted by a given project, must inventory and evaluate assets, and then mitigate, or compensate, for impacts to the asset. ITAs include property in which a Tribe has legal interest, such as lands, minerals, water rights, and hunting and fishing rights. While most ITAs are located on a reservation, they can also be located off-reservation. For example, tribal entitlements to water rights pursuant to water rights settlements are considered trust assets, although the reservations of these Tribes may or may not be located along the river. A Tribe may also have other off-reservation interests and concerns that must be taken into account.

3.8.1.2 ITAs and Other Tribal Resources in the Project Area

Reclamation has met with the Quechan Nation to elicit their opinions and potential concerns regarding the proposed action. The Quechan Council on the Fort Yuma Reservation was briefed about the Project on September 15, 2005 and November 16, 2005, at which time the council was provided project materials that were previously distributed during the public scoping meeting. In addition, a representative of the Fort Yuma Reservation participated in the archaeological field reconnaissance that was conducted for the Project (see section 3.5 for more information). Reclamation has also apprised the Bureau of Indian Affairs (BIA), Phoenix Office, of the proposed action.

Based on discussions with the Quechan Council and BIA, there are no recorded ITAs within the proposed project area. The Quechan Council has requested that they be kept informed about the Project, especially regarding potential cultural resources impacts. In a letter dated February 10, 2006, the Quechan Tribe expressed their support for the restoration project and offered additional suggestions for further enhancements (see Appendix C). Reclamation looks forward to working with the tribe on these issues during future projects. No other issues of tribal concern were expressed during these meetings.

3.8.2 Environmental Consequences and Mitigation Measures

The proposed action and alternatives were reviewed to determine whether effects of the components of the Federal actions would have an adverse impact on tribal resources, including ITAs.

3.8.2.1 Alternative 1 — Proposed Action

Environmental Consequences There are no ITAs or other resources of tribal concern in the project area. Therefore, significant impacts to ITAs or other tribal resources from implementation of the proposed action would not occur.

Reclamation intends to keep both the Quechan Council and BIA informed of the project's progress, even though no archaeological sites were documented within the project area and no heritage preservation issues have been identified by any consulting parties.

Mitigation Measures Because no significant impacts on ITAs would occur as a result of implementation of the proposed action, no mitigation measures are proposed.

The environmental consequences of implementation of habitat restoration under the LCR MSCP, including the specific wetlands restoration activities at the Imperial NWR, have been addressed in separate NEPA compliance documents, the LCR MSCP EIS (LCR MSCP 2004a) and the Lower Colorado River National Wildlife Refuges Comprehensive Management Plan EA (USFWS 1994), respectively.

3.8.2.2 Alternative 2

The environmental consequences would be the same as under the proposed action. Tribal resources would not be impacted by this alternative.

3.8.2.3 Alternative 3

The environmental consequences would be the same as under the proposed action. Tribal resources would not be impacted by this alternative.

3.8.2.4 No-Action Alternative

Under the No-Action Alternative, no dredging or sediment disposal activities would occur, and environmental conditions would continue as currently exists. Tribal resources would not be impacted by this alternative.

3.9 Land Use

This section discusses existing land uses at and adjacent to the project area in order to evaluate the compatibility of the proposed alternatives with those uses. This section also addresses the potential for the proposed dredging activities to impact agricultural resources.

3.9.1 Affected Environment

3.9.1.1 Land Use

Regulatory Setting Land use attributes addressed in this analysis focus on general land use patterns, management plans, policies, and regulations. These provisions determine the types of uses that are allowable and identify appropriate design and development standards used to address specially designated or environmentally sensitive areas. State and Federal agencies are not subject to local land use and zoning regulations; however, these agencies cooperate with local agencies to avoid conflicts to the extent feasible. Although the project site is not subject to local land use and zoning regulations, the following adopted plans and studies present factors affecting land use and include recommendations to assist officials and local community leaders in ensuring compatible development.

Lower Colorado River Multi-Species Conservation Program Conservation Plan The LCR MSCP is an authorized and permitted conservation program under the ESA and CESA. The Conservation Plan is a comprehensive, habitat-based approach developed to provide ESA compliance for species that are currently listed under the ESA or that may become listed in the future. Because the LCR MSCP is seeking compliance for a 50-year period, the Conservation Plan includes minimization and mitigation measures for species not currently listed under the ESA that may become listed within the term of the permit. The LCR MSCP provides for the conservation of habitat that offsets the habitat impacts of all covered activities, including the Project, and contributes to the recovery of various endangered and threatened species of fish, wildlife, and plants. The LCR MSCP conservation measures include maintenance of existing habitat, creation of new habitat, avoidance and minimization of impacts on habitat, population enhancement of specific species, monitoring and research, and adaptive management. The program is implemented and funded by a partnership of state, Federal (including Reclamation), and other public and private stakeholders in Arizona, California, and Nevada with interests in managing the water and related resources of the Lower Colorado River (LCR MSCP 2004a).

Yuma Field Office Resource Management Plan (Proposed Revision to 1987 Yuma District Resource Management Plan) Pursuant to the U.S. Department of the Interior's Departmental Manual 613 (DM 613), the Bureau of Land Management (BLM) manages Reclamation withdrawn lands in the project vicinity. Although Reclamation maintains jurisdiction of the lands within the project area, BLM maintains primary responsibility for managing wildlife and recreational resources within the project area. BLM is also responsible for implementation of the Resource Management Plan (RMP). BLM is currently in the process of updating and revising the *1987 Yuma District Resource Management Plan* for federal lands within the project area.

Existing Setting The Laguna Reservoir storage site is situated between Imperial Dam to the north, the Laguna Desilting Basin to the southeast, Laguna Dam to the south, and Mittry Lake and the Old River Channel to the west. Although some of the project site is located on or adjacent to tribal lands within the Fort Yuma Reservation boundary, these Reclamation-withdrawn lands are currently used for water storage, delivery, and sediment disposal from maintenance dredging activities. Reclamation continues to hold fee title to the Laguna Dam infrastructure, Laguna Settling Basin, and Sediment Disposal Area within the Reservation boundaries and maintains the rights to operate, maintain, and reconstruct these appurtenances through existing reservations made in an existing security and protection zone for those purposes. The majority of the project site is located within Reclamation's jurisdiction; however, a portion of the site is located on tribal lands outside Reclamation's security zone.

3.9.1.2 Agricultural Resources

Regulatory Setting Individual counties and municipalities regulate agricultural land uses primarily through the adoption of land use plans, policies, and agricultural zoning that restrict the location, type, and intensity of land development and use that is allowed. The California Department of Conservation (CDOC) has the primary responsibility for regulation and reporting related to California agricultural lands. The Arizona Department of Agriculture is the administering agency in Arizona. Agricultural resources on tribal lands are governed by the tribal governments.

This analysis meets the requirements of the Farmland Protection Policy Act (7 USC 4201) on a programmatic basis. This Act is the Federal statute that provides the basis for the policy of avoiding impacts from Federal programs. The Act does not prohibit Federal agencies from undertaking actions that convert farmland to nonagricultural use, but only requires that Federal agencies "identify and take into account the adverse effects of Federal programs on the preservation of farmland; consider alternative actions, as appropriate, that could lessen such adverse effects; and assure that such Federal programs, to the extent practicable, are compatible with State (and local) programs and policies to protect farmland" (7 USC §4202[b]).

Existing Setting The Imperial Valley and Yuma Mesa and surrounding valleys contain a variety of agricultural uses ranging from field crops (alfalfa, hay) and row crops (citrus) to livestock production. The area's favorable climate, abundance of arable lands in valley regions, fertile soils, and the availability of adequate water transported from the Colorado River via a complex canal system provide ideal conditions for an abundant array of crops. Approximately 20 percent of lands (512,163 acres) within Imperial Valley are irrigated for agricultural purposes (Imperial County 1996). Approximately 238,900 acres of farmlands are harvested annually in Yuma County (Tickes et al. 2002). However, buildout within Imperial Valley and the Yuma Mesa area has resulted in the conversion of productive agricultural lands to non-agricultural uses.

The Laguna Reservoir is located on primarily flat lands within the existing floodplain of the Colorado River. On-site soils consist of Indio silt loam and Holtville clay, which are hyperthermic arid soils that are deep, stratified, and coarse to fine textured that are generally located on level to gently sloping areas on floodplains and lower alluvial fans (U.S. Department of Agriculture [USDA] undated). The reservoir site primarily includes low wetland and riparian areas that are not recognized as Important Farmland. Although some soils located within the

project area are recognized as agriculturally prime soils by the USDA (USDA 2003), these soils have never been farmed. The project area consists of federally-owned lands that are managed by Reclamation for water delivery, storage, and infrastructure maintenance; the project area is not used for agricultural purposes. Accordingly, the project area is not part of an agricultural preserve contract that would commit it to long-term agricultural uses. However, agricultural lands located north of the Laguna Dam weir are currently in agricultural use.

3.9.2 Environmental Consequences and Mitigation Measures

3.9.2.1 Alternative 1 — Proposed Action

Land Use Impacts on land use patterns and land management plans would be considered significant if the proposed action would physically divide an established community; conflict with existing land uses; conflict with any applicable land use plan, policies, or regulations; or conflict with any applicable habitat conservation plan or natural community conservation plan.

Environmental Consequences Proposed excavation and vegetation removal activities would not physically divide an established community; the project would be implemented on undeveloped lands located away from populated, developed areas. The project would consist of increasing storage within an existing reservoir, mostly in areas where a reservoir pre-existed prior to the high flows from 1983 to 1988; therefore, no introduction of any new incompatible land uses and/or disruption or division of established land use configurations would occur. Furthermore, since dredging activities (including staging areas) would occur within the existing reservoir site, no acquisition of private right-of-way and/or encroachment onto privately owned lands would occur.

Restoring Laguna Reservoir's original capacity would result in the permanent loss of approximately seven acres of wetland habitat. However, dredging footprints associated with proposed excavation activities have been designed to avoid as much wetland habitat as possible while achieving the necessary functional improvements to Laguna Reservoir. Additionally, the proposed action is a covered activity under the LCR MSCP. The LCR MSCP is an authorized and permitted conservation program under the ESA that provides for the conservation of habitat that offsets the habitat impacts of all covered activities, including the Project, and contributes to the recovery of various endangered and threatened species of fish, wildlife, and plants (see section 3.4.2 - Biological Resources for additional information). Furthermore, the implementation of conservation measures on Federal or state lands would not conflict with any management plans because they would occur only in cooperation with the managing agency and its goals and objectives. Therefore, the proposed action would not impede the implementation of the RMP plans or policies. Accordingly, the proposed action would not conflict with any applicable federal land use plan, policy, or regulation.

Although the project site is not subject to local land use and zoning regulations, implementation of the proposed action would be consistent with the guidelines specified in the Imperial County General Plan. Specifically, Land Use Element Goal 3 identifies the importance of achieving balanced growth while preserving the unique natural, scenic, and agricultural resources of Imperial County. Project activities would increase the reservoir's water storage capacity and improve the operational integrity of Laguna Dam, ensuring efficient dam operations below

Imperial Dam while preserving natural habitats to the extent feasible. As irrigation is critical to maintain economic development in the Imperial Valley, the proposed action would ensure consistency with Land Use Element Goal 3.

The proposed action would have a long-term beneficial impact on existing recreational opportunities in the project area (see below). Proposed sediment and vegetation removal activities would increase the amount of open water behind Laguna Dam adjacent to the existing open water channel, enhancing recreational opportunities (including fishing, hunting, canoeing and bird-watching) in the project area. Although increases in boating opportunities in the project area would potentially increase wave action on adjacent habitats, there is potential for the implementation of boat speed restrictions in the project area by establishing a "no-wake" zone in the future. Accordingly, the proposed action would be consistent with the 2020 Plan objectives associated with protecting open space and recreational resources in Yuma County.

Mitigation Measures No mitigation measures specific to land use are required.

Agricultural Resources Impacts on prime agricultural land and agricultural land productivity would be considered significant if the proposed action would conflict with existing zoning for agricultural use, or other legal protections (i.e., agricultural preserve programs) for agricultural use; or convert a substantial portion of the available Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Important Farmland) in the project area to nonagricultural use.

Environmental Consequences Dredging and vegetation removal activities would occur within the defined project footprint areas; dredging staging areas would also be located within these areas (see Figure 2-1). Therefore, construction activities would not conflict with agricultural operations on lands north of Laguna Dam currently in agricultural production. Although some onsite soils are recognized as agriculturally prime soils by the USDA, these soils are not located within the wetland and riparian areas within the project footprint. Furthermore, the project area and surrounding lands are federally-owned lands that are managed by Reclamation and not used for agricultural purposes. As construction activities would not affect agriculturally prime soils and/or regionally unique agricultural resources, significant impacts would not occur.

Mitigation Measures Because significant impacts on agricultural resources would not occur, no mitigation measures are proposed.

The environmental consequences of implementation of habitat restoration under the LCR MSCP, including the specific wetlands restoration activities at the Imperial NWR, have been addressed in separate NEPA compliance documents, the LCR MSCP EIS (LCR MSCP 2004a) and the Lower Colorado River National Wildlife Refuges Comprehensive Management Plan EA (USFWS 1994), respectively.

3.9.2.2 Alternative 2

Land Use Under this alternative, approximately 16.0 acres of jurisdictional wetlands would be removed and converted to open water, and increased dredging activity and storage would be required to expand the reservoir capacity to 2,800 af. Alternative 2 would permanently remove

an additional 12 acres of wetland habitats compared to the proposed action, increasing the potential for conflicts with BLM's RMP policies adopted for the purpose of managing sufficient wildlife habitat. Overall, this alternative would have greater impacts on land use compared to the proposed action; however, such impacts would remain less than significant.

Agricultural Resources Increasing the reservoir's storage capacity to 2,800 af would result in no discernable difference to impacts on agricultural resources. As all dredging activities and staging areas would be located within the defined project footprint, impacts would be similar to those described for the proposed action.

3.9.2.3 Alternative 3

Land Use Under this alternative, approximately 16.1 acres of jurisdictional wetlands would be removed and converted to open water to accommodate increasing the reservoir's storage capacity to 1,500 af. As dredging footprints would only be designed to maximize functional improvements to the reservoir, Alternative 3 would result in additional impacts on wetland habitats that would be inconsistent with the goals and objectives delineated in BLM's RMP. Therefore, this alternative would result in greater impacts on land use compared to the proposed action; however, such impacts would remain less than significant.

Agricultural Resources Removing an additional 16.1 acres of jurisdictional wetlands to increase the reservoir's storage capacity to 1,500 af would result in no discernable difference to impacts on agricultural resources. As all dredging activities and staging areas would be located within the defined project footprint, impacts would be similar to those described for the proposed action.

3.9.2.4 No-Action Alternative

Land Use Under the No-Action Alternative, the reservoir's pre-1983 storage capacity would not be restored. Although no short-term construction activities would occur, no long-term beneficial effects associated with the proposed action would result. If increased sedimentation is left unchecked, this alternative would conflict with federal and local resource management policies, resulting in potentially significant impacts.

Agricultural Resources Maintaining the reservoir's existing, inadequate storage capacity could result in the dam not functioning as designed and adjacent agricultural areas being more readily inundated during low flow floods when water would not pass over the weir properly. Thus, the No-Action Alternative could result in potentially significant impacts.

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3.10 Noise

This section addresses noise from potential sources related to the implementation of the Project, including noise impacts from dredging activities and other potential long-term operational noise. Potential noise impacts on wildlife are discussed in section 3.3 (Biological Resources).

3.10.1 Affected Environment

Noise may be defined as unwanted sound, and is usually objectionable because it is disturbing or annoying. Several noise measurement scales are used to describe noise in a particular location. A decibel (dB), which is calculated on a logarithmic basis, is a unit of measurement that indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, 30 dB is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10-dB increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities.

Because of the logarithmic nature of the decibel, each doubling of distance from a point noise source results in a 6 dB decrease in the sound level. For example, a piece of equipment generating 86 dB at a reference distance of 50 feet would produce 80 dB at 100 feet, 74 dB at 200, 68 dB at 400 feet, 62 dB at 800 feet and 56 dB at 1,600 feet. However, this is a conservative worst case estimate. There would be additional attenuation (loss) because of absorption of noise by soft ground surfaces and atmospheric variations. Other important attenuation results from blocking of the noise path by topography, by vegetation, and by man-made structures including buildings and sound walls. Combined, these factors can reduce the noise levels substantially from the numbers given in the above example and the estimates given below.

There are several methods of characterizing sound. The most common is the A-weighted sound level or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

Because the sensitivity to noise increases during the evening and at night—excessive noise interferes with the ability to sleep—24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The Community Noise Equivalent Level (CNEL) is a measure of the cumulative noise exposure in a community, with a 5-dB penalty added to evening (7:00 P.M. to 10:00 P.M.) and a 10-dB addition to nocturnal (10:00 P.M. to 7:00 A.M.) noise levels. The Day/Night Average Sound Level (L_{dn}) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this 3-hour period are grouped into the daytime period.

3.10.1.1 Regulatory Environment

Land use compatibility with differing noise levels is regulated at the local level, although the Federal government has established suggested land use compatibility criteria for different noise zones (Federal Interagency Committee on Urban Noise 1980). Residential areas and schools are considered compatible where the L_{dn} is up to 65 dBA; outdoor recreational activities such as fishing, golfing and horseback riding are compatible with noise levels up to 75 dBA; and parks are compatible with noise levels up to 75 dBA.

Noise regulations established by local jurisdictions that govern stationary noise sources are typically included in noise ordinances, although policies that limit public exposure to noise may be included in the general or community plans of individual cities or counties. Some jurisdictions also have specific provisions addressing construction noise impacts that often limit the hours and days of construction and may establish noise thresholds that may not be exceeded at specific locations, such as the property line of the site that is under construction. Tables 3-12 and 3-13 provide summaries of the regulations governing noise from construction and long-term operations, respectively, for Imperial County and Yuma County, where the closest sensitive noise receptors are located (see below).

Table 3-12. Construction Noise Regulations

County/State	*L_{dn} or CNEL (dBA)*
Imperial County, CA	75 dBA L_{eq} when averaged over an 8-hour period and measured at the nearest sensitive receptor (e.g., residences, schools, hospitals, parks, office buildings, and certain non-human species, including riparian bird species).
Yuma County, AZ	None.

Table 3-13. Long-Term Noise Compatibility Thresholds

County/ State	*Noise Ordinance/ Controls? Yes/No*	**L_{dn} OR CNEL (dBA)**			
		Residential	*Commercial*	*Industrial*	*Recreational*
Imperial County, CA	Yes	Daytime [50-55dB] Nighttime [45-50 dB]	Daytime [60dB] Nighttime [55 dB]	Anytime [70-75dB]	Not specified
Yuma County, AZ	No	NA	NA	NA	NA
1. Daytime is typically 7:00 A.M. to 10:00 P.M. and nighttime is typically 10:00 P.M. to 7:00 A.M.					

3.10.1.2 Sensitive Noise Receptors in the Project Area

The nearest individuals in the project vicinity are people who stay at a recreation trailer park across S-24 near the Laguna Dam, in Imperial County, California. According to Reclamation, the park is mainly populated by winter visitors (personal communication, Garvey 2005). This park is directly adjacent to S-24 and is currently subjected to a fairly high level of noise because of the existing traffic. It is approximately 500 feet from the end of the dam near S-24. Other recreational users can be found in nearby Mittry Lake Wildlife Area and Betty's Kitchen Wildlife Area and Interpretive Trail (see section 3.11 – Public Services for a description of recreational activities at these sites).

These areas are several thousand feet from the end of the dam near S-24. No other sensitive receptors (e.g., hospitals, schools, residential neighborhoods) are located near the project area.

3.10.2 Environmental Consequences and Mitigation Measures

Noise impacts would occur if the project would result in exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies; exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels; a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The environmental consequences of implementation of habitat restoration under the LCR MSCP, including the specific wetlands restoration activities at the Imperial NWR, have been addressed in separate NEPA compliance documents, the LCR MSCP EIS (LCR MSCP 2004a) and the Lower Colorado River National Wildlife Refuges Comprehensive Management Plan EA (USFWS 1994), respectively.

3.10.2.1 Alternative 1 — Proposed Action

Environmental Consequences The proposed action would require standard construction activities, including vegetation removal, launch ramp construction, dredging operations, access road maintenance, and periodic maintenance dredging. No elements of the Project would result in excessive groundborne vibration or groundborne noise levels.

The nearest receptor (a recreation trailer park) is more than 400 feet away from any equipment operation. Calculated noise levels at various distances from dredging activities are presented in Table 3-14. These numbers reflect a conservative approach, assuming high noise levels for the construction equipment. Additional attenuation would be expected due to atmospheric and topographic effects. The day-night noise level would be less than 75 db at about 300 feet and less than 70 db at 400 feet for all phases of the project activities. This noise level would drop to 60 dB at about 1,400 feet from the trailer park, as dredging operations moved farther away. These noise levels are compatible with both Federal and county guidelines discussed above.

Traffic noise as a result of project activities would be associated with worker transportation and transportation of construction equipment. It is not expected to generate a noticeable increase in noise generated from existing S-24 traffic.

Table 3-14. Maximum Noise Levels (L_{dn}) with No Noise Reduction Measures in Place

Feet	*Vegetation Removal*	*Launch Ramp Construction*	*Dredging Operations*	*Access Road Maintenance*	*Periodic Maintenance Dredging*
50	84	85	87	81	87
100	78	78	81	75	81
200	72	73	75	69	75
300	68	69	71	66	71
400	66	67	69	63	69
500	64	65	67	62	67
600	63	64	66	61	66
700	62	62	64	60	64
800	61	62	63	59	63
900	60	61	63	58	63
1,000	60	60	62	58	62
1,200	59	59	61	57	61
1,400	58	58	60	57	60
1,600	57	58	59	56	59
1,800	57	57	58	56	58
2,000	57	57	58	56	58
2,500	56	56	57	56	57
Note: Background Noise Level = 55 dBA (assumed at the Trailer Park)					

There may be minor noise impacts on recreational users of the nearby Mittry Lake Wildlife Area and Betty's Kitchen Wildlife Area and Interpretative Trail to the west of the project area. However, most of the dredging activities would occur at a much greater distance than 400 feet from the these recreational areas and, therefore, should be well below the 75 db threshold. Also Reclamation has agreed to suspend activities during the Yuma Birding Festival field trips. The project would not impact the use of this wildlife area. Because of the distance from the recreation trailer park to the proposed dredging activities in conjunction with the existing background noise generated from S-24, significant noise impacts are not expected. No other sensitive noise receptors would be impacted by the proposed action.

Mitigation Measures Because of the relatively low level of noise impacts occurring from implementation of the proposed action, no mitigation measures are required.

3.10.2.2 Alternative 2

The impacts of Alternative 2 would be greater than those for the proposed action because of the increased amount of dredging and, therefore, dredging operations would last longer. However, because of the relatively low level of direct impact upon nearby recreational visitors, no mitigation measures are required.

3.10.2.3 Alternative 3

The impacts of Alternative 3 are similar to that of the proposed action. Because of the relatively low level of direct impact upon nearby recreational visitors, no mitigation measures are required.

3.10.2.4 No-Action Alternative

Since no noise-inducing activities would occur, there are no noise impacts as a result of the No-Action Alternative.

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3.11 Public Resources

This section addresses potential impacts related to public resources, such as recreation and energy/depletable resources. A detailed analysis of public utilities and services was not performed because the proposed action and alternatives would have minimal impacts on wastewater treatment, water supply and treatment, storm water drainage, landfill capacity, or the need for new or physically altered facilities; therefore, these resources are not discussed further.

3.11.1 Affected Environment

Recreation

BLM manages several recreation facilities on public lands, including wildlife areas, national wilderness areas, and national conservation areas. The numerous recreation activities in the project area include but are not limited to boating, viewing the scenery and wildlife, camping, picnicking, hiking, bicycling, hunting, and fishing. Some fishing and picnic areas are located adjacent to the reservoir, and a small recreational trailer park is located across S-24 near the Laguna Dam.

Recreational facilities located on BLM administered lands in the project vicinity include the Mittry Lake Wildlife Area and Betty's Kitchen Wildlife Area and Interpretive Trail. The Mittry Lake Wildlife Area, located east of Laguna Reservoir, encompasses approximately 750 acres and serves as a popular recreation area for numerous activities. Recent rehabilitation efforts at Mittry Lake, including marsh dredging, revegetation, and fish habitat improvement, have created an ideal environment for small game hunting and sportfishing. Additional recreational opportunities offered at Mittry Lake include camping, boating, hiking, fishing, swimming, wildlife viewing, and sightseeing. This area is jointly managed by the BLM, Reclamation, and the Arizona Game and Fish Department.

Betty's Kitchen is a wildlife interpretive area located south of the project site, along the Colorado River north of Laguna Dam. This area is managed by the Betty's Kitchen Protective Association in cooperation with BLM for its riparian habitat values and to provide environmental education and recreational opportunities. Recreational amenities include a wildlife viewing area, a 0.5 mile interpretive trail, an outdoor classroom, ramadas, a fishing pier, picnic areas, and a parking area.

Energy/Depletable Resources

NEPA requires an analysis of significant, irreversible effects of energy and depletable resources resulting from implementation of a proposed action. Resources that are irreversibly or irretrievably committed to a project are those that are typically used on a long-term or permanent basis; however, those used on a short-term basis that cannot be recovered (e.g., non-renewable resources such as metal, wood, fuel, paper, and other natural or cultural resources) also are irretrievable. Human labor also is considered an irretrievable resource. All such resources are irretrievable in that they are used for one project and thus become unavailable for other purposes. Additionally, an impact that falls under the category of the irreversible or irretrievable

commitment of resources is the destruction of natural resources that could limit the range of potential uses of that resource.

Potential impacts on hydroelectric power, an energy resource, are discussed in section 3.7 (Hydrology/Water Quality), because such impacts are directly related to Reclamation's operation of Imperial and Laguna Dams. Dam operations are discussed in detail in the hydrology section.

3.11.2 Environmental Consequences and Mitigation Measures

3.11.2.1 Alternative 1 — Proposed Action

Recreation Impacts on recreation would be considered significant if the proposed action would cause the direct loss or substantial physical degradation of either public recreation uses or public recreational facilities resulting in decreased recreational opportunities, such as sport fishing, bird watching, or waterfowl hunting.

Environmental Consequences Although dredging activities would occur within the reservoir for up to 3 years, dredging would occur in only portions of the reservoir at a time. Dredging footprints would be designed to maintain sufficient access to adjacent passive recreational opportunities. This would allow sections of the reservoir to be publicly accessible during sediment and vegetation removal activities. As project dredging activities would not substantially preclude access to existing passive recreational opportunities (fishing and picnic areas) within or adjacent to the reservoir, significant impacts would not occur.

Increasing storage behind Laguna Dam to approximately 1,500 af would increase the available open water area accessible to the public. Accordingly, long-term beneficial effects on recreation would likely occur as the proposed action would result in increased opportunities for fishing, hunting, bird watching, and other recreational activities adjacent to the reservoir. Reclamation intends to cooperate with BLM and other interested parties regarding future recreational opportunities in the Laguna Reservoir.

Mitigation Measures Because significant impacts on recreational resources would not occur, mitigation measures are not proposed.

Energy/Depletable Resources

Environmental Consequences Implementation of the proposed action would result in an irreversible commitment of fuel for construction vehicles and equipment, human labor and other resources. Energy (electricity and natural gas) and water consumption, as well as demand for services, would not increase as a result of the implementation of the proposed action. These commitments of resources are neither unusual nor unexpected, given the nature of the action. Potential impacts on hydroelectric power are discussed in section 3.7.1.

The proposed action would not result in the destruction of environmental resources such that the range of potential uses of the environment would be limited, nor affect the biodiversity of the region (see section 3.3 - Biological Resources, for additional information).

Mitigation Measures Because significant impacts on energy and depletable resources would not occur, mitigation measures are not proposed.

The environmental consequences of implementation of habitat restoration under the LCR MSCP, including the specific wetlands restoration activities at the Imperial NWR, have been addressed in separate NEPA compliance documents, the LCR MSCP EIS (LCR MSCP 2004a) and the Lower Colorado River National Wildlife Refuges Comprehensive Management Plan EA (USFWS 1994), respectively.

3.11.2.2 Alternative 2

Recreation Under this alternative, increased dredging activities would be required to expand the reservoir's capacity to 2,800 af. Although Alternative 2 would require additional sediment and vegetation removal activities that would increase the duration of dredging activities compared to the proposed action, this alternative would increase the overall open water area and associated recreational opportunities accessible to the public. Overall, this long-term beneficial effect on recreational resources would be greater compared to the proposed action.

Energy/Depletable Resources The environmental consequences would be similar to the proposed action, except the proposed larger-scale dredging operations would require additional commitments of fuel for construction vehicles and equipment, human labor and other resources. Additional wetland habitat also would be affected, but this would not result in the destruction of environmental resources such that the range of potential uses of the environment would be limited, nor affect the biodiversity of the region.

3.11.2.3 Alternative 3

Recreation Removing an additional 16.1 acres of wetland habitat to increase the reservoir's storage capacity to 1,500 af would result in no discernible difference to impacts on recreational resources. The long-term beneficial effects on recreational resources associated with this alternative would be similar to those described for the proposed action.

Energy/Depletable Resources The environmental consequences would be similar to the proposed action, except additional wetland habitat would be affected. This would not result in the destruction of environmental resources such that the range of potential uses of the environment would be limited, nor affect the biodiversity of the region.

3.11.2.4 No-Action Alternative

Recreation Under the No-Action Alternative, excavation and vegetation removal activities would not occur and the storage capacity of the reservoir would not be enlarged. If sedimentation is allowed to continue, the reservoir could fill completely with sediment and vegetation, leaving very little to no open water for recreational use. The long-term beneficial effects associated with the Project would not result under this alternative, and the potential loss of open water habitat in the future could lead to significant impacts on recreation.

Energy/Depletable Resources No dredging activities would occur under the No-Action Alternative and, therefore, there would be no need for additional commitments of fuel for construction vehicles and equipment, human labor and other resources. No wetlands or other habitat would be affected.

3.12 Socioeconomics

The analysis of socioeconomics addresses population, housing, and employment. Environmental justice (i.e., effects on minority and low-income populations) is addressed in section 3.5.

3.12.1 Affected Environment

3.12.1.1 Regulatory Setting

Under NEPA, the economic and social effects of the proposed action must be addressed if they are interrelated to the natural or physical environmental effects (40 CFR Sec. 1508.14). The definition of the term "effects" under NEPA also includes economic and social factors (40 CFR Sec. 1508.8). No other statutes or regulations that address socioeconomics would apply to this EA.

3.12.1.2 Population, Housing, and Employment

The study area for socioeconomics includes the area in which the majority of socioeconomic effects would occur. For population and housing, this includes Imperial County, California and Yuma County, Arizona, the city of Yuma within Yuma County, and the Fort Yuma Reservation. Data on employment is addressed at the county level for Imperial and Yuma counties.

Imperial County contained a population of 142,361 persons in 2000 compared to 160,026 persons in Yuma County. The City of El Centro contained 37,835 persons and the City of Yuma 77,515 persons (U.S. Census Bureau 2000). Table 3-15 summarizes population and housing data for the study area in 2000. The Census also reports data for Winterhaven, California (i.e., the Winterhaven Census Designated Place or CDP). The population of Winterhaven population was 529 in 2000. The community contained 219 total housing units, for which the vacancy rate was 16.4 percent. Of the occupied housing units, 47.5 percent are owner-occupied.

Table 3-15 Population and Housing Characteristics (2000)

Item	*Imperial County, CA*	*Yuma County, AZ*	*City of Yuma, AZ*	*Fort Yuma Reservation, CA--AZ*
Population	142,361	160,026	77,515	2,376
Housing Units	43,891	74,140	34,475	962
Housing Vacancy Rate (Percent)	10.3	27.4	22.7	18.9
Percent of Housing Owner-Occupied	58.3	72.3	63.5	65.1

For each of the counties, the most recent employment data are 2003 data from the Bureau of Economic Analysis, and the most recent data regarding farms and cropland are contained in the 2002 Census of Agriculture. Full- and part-time employment in Imperial County increased from 61,974 jobs in 2001 to 66,672 jobs in 2003, for a total increase of 4,698 jobs (approximately 7.6 percent). Farm employment increased from 5,593 jobs in 2001 to 5,815 jobs in 2003, for a total increase of 222 jobs (approximately 4.0 percent). Employment in all

sectors of the economy increased, with the exception of four sectors: construction; information; finance and insurance; and accommodation and food services. The numerically greatest gains were experienced in the manufacturing, government and government enterprises, and retail trade sectors (Bureau of Economic Analysis 2003).

Full- and part-time employment in Yuma County increased from 74,896 jobs in 2001 to 77,858 jobs in 2003, for a total increase of 2,962 jobs (approximately 4.0 percent). Between 2001 and 2003, farm employment in Yuma County decreased by approximately 1.8 percent. Employment in all sectors of the county's economy increased, with three exceptions. Wholesale trade declined by 10.9 percent, retail trade by 1.9 percent, and the arts, entertainment, and recreation sector declined by approximately 7.9. The numerically greatest gains were experienced in the following sectors: construction; administrative and waste services; health care and social assistance; and government and government enterprises, especially state and local government (Bureau of Economic Analysis 2003).

For Colorado River system users in Imperial and Yuma counties, water supply is a critical component supporting agricultural production. Part of Reclamation's mission is to promote the beneficial use of water from its facilities, including water used for agricultural production. In 2002, the amount of land in farms exceeded 514,000 acres in Imperial County and 231,000 acres in Yuma County. The total market value of agricultural products sold in Imperial County was $1.043 billion and $802 million in Yuma County. There were 537 farms in Imperial County and 531 farms in Yuma County. The average market value of agricultural products sold per farm in Imperial County was $1.942 million and $1.511 million in Yuma County. The average farm size was almost twice as large in Imperial County, 957 acres compared to 435 acres in Yuma County (USDA 2002).

3.12.2 Environmental Consequences and Mitigations

3.12.2.1 Alternative 1 – Proposed Action

Environmental Consequences The proposed action would have negligible effects on population and housing, and does not propose new homes or businesses. The proposed action would not displace persons or housing, nor would it induce substantial population growth in the area, either directly or indirectly. As described below, dredging and maintenance workers are anticipated to reside in nearby communities, primarily Yuma, and minimal relocation of workers is anticipated. Most of the work would be conducted by existing Reclamation staff. Dredging activities would last approximately three years with periodic maintenance dredging approximately every four years thereafter.

Dredging activities associated with the proposed action would provide economic benefits associated with purchases of materials, supplies, services, and construction employment. The estimated construction expenditure for the proposed action is $10.5 million. Some portion of the construction workers are expected to reside in the City of Yuma; their wages and expenditures would provide benefits to Yuma County. Purchases of materials, supplies, and services for construction would come from either the local area or the larger region, depending upon contractor selection and the locations where purchases are made.

The reservoir site is located on federally-withdrawn land and Fort Yuma Indian Reservation Land. The proposed action would not require acquisition of private property and, therefore, no loss of property tax revenues is anticipated.

Mitigation Measures The proposed action would not result in adverse impacts to socioeconomic resources. No mitigation measures are proposed.

The environmental consequences of implementation of habitat restoration under the LCR MSCP, including the specific wetlands restoration activities at the Imperial NWR, have been addressed in separate NEPA compliance documents, the LCR MSCP EIS (LCR MSCP 2004a) and the Lower Colorado River National Wildlife Refuges Comprehensive Management Plan EA (USFWS 1994), respectively.

3.12.2.2 Alternative 2

Like the proposed action, Alternative 2 would increase storage behind Laguna Dam, but to a greater extent. Like the proposed action, Alternative 2 would have negligible effects on population and housing. Dredging activities associated with Alternative 2 would provide economic benefits associated with purchases of materials, supplies, services, and temporary increases in construction employment. These benefits could potentially be greater than the proposed action, assuming that increased dredging (e.g., more cubic yards of material would be removed from upland areas) would increase the expenditures required to construct the increased storage. Alternative 2 would not result in adverse socioeconomic impacts.

3.12.2.3 Alternative 3

Like the proposed action, Alternative 3 would increase storage behind Laguna Dam to 1,500 af, but would not provide the reduced wetlands impacts included under the proposed action. Like the proposed action, Alternative 3 would have negligible effects on population and housing. Dredging activities associated with Alternative 3 would provide economic benefits associated with purchases of materials, supplies, services, and temporary increases in construction employment. These benefits would be similar to the proposed action. Alternative 3 would not result in adverse socioeconomic impacts.

3.12.2.4 No-Action Alternative

Under the No-Action Alternative, sediment dredging and vegetation removal would not occur in Laguna Reservoir. The economic benefits of the proposed action would not occur. No adverse effects on population and housing would be avoided because none would occur under the proposed action.

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3.13 Topography, Geology, Soils, and Mineral Resources

3.13.1 Affected Environment

Topography and Geology

The Lower Colorado River area of Arizona and California is located in the lower Basin and Range Geomorphic Province, within the western Sonora Desert. This area is characterized by numerous mountain ranges that rise abruptly from broad, plain-like valleys or basins. The Lower Colorado River generally consists of narrow stretches confined by resistant bedrock cliffs and bluffs and broad areas lined by low-lying alluvial floodplains (USDA Soil Conservation Service 1974, 1986). From the Imperial Dam to the Northerly International Border, which includes the project area, the river passes primarily through relatively flat-lying topography, underlain by Quaternary alluvium. Localized outcrops of Plio/Pleistocene sandstone, shale, and gravel deposits are present along the banks of the river (California Division of Mines and Geology [CDMG] 1977; Arizona Geological Survey [AGS] 2000). Since the area between Laguna Dam and Imperial Dam appears to have filled in from sedimentation, these sediments are assumed to consist of silt and fine sand (Reclamation 2004).

The existing 100-year floodplain along the Colorado River is the lower of two floodplains. The active floodplain, which encompasses the project area, has low relief and includes the stream channel and associated features, such as point bars and abandoned channels or meanders. Ground surface elevations vary from approximately 144 to 160 feet above mean sea level. Sand splays, point bars, and meander scrolls are typically underlain by coarse-grained alluvium. Annual flooding inundates these floodplains, except where protected by levees. The landscape of the floodplain changes annually as a result of cutting of new channels, abandonment of older channels, lateral meander migration, and downstream movement of alluvial deposits (Parsons et al. 1986).

Soils

Surficial soils in the project area consist of Torrifluvents Association soils, which are deep, stratified, coarse- to fine-textured, nearly level to gently sloping soils on floodplains and lower alluvial fans (USDA Soil Conservation Service 1975). The soils on the Colorado River floodplain are also saline, as a result of infestation of non-native salt cedar, as well as accumulated salts from alluvial deposits and subsequent evaporation of soil moisture. The rainfall is not sufficient to leach these salts below the plant root zone; therefore, a continuing accumulation of salts occurs (USDA Soil Conservation Service 1986).

Seismicity

A probabilistic seismic hazard analysis was completed by URS Corporation in 2003 to determine the seismic risk for nearby Imperial Diversion and Senator Wash dams. The analysis concluded that the project area is generally characterized by low seismicity (Reclamation 2004). The nearest active fault is the Imperial Fault, located approximately 48 miles southwest of the project

area (Jennings 1994). There is a 10 percent probability that peak ground accelerations at the project site will exceed 0.2 g (percent of gravity), during the next 50 years. This is considered a relatively low shaking hazard (Petersen et al. 1999).

The Uniform Building Code defines different regions of the U.S. and ranks them according to their seismic hazard potential. There are four types of these regions, including Seismic Zones 1 through 4, with Zone 1 having the least seismic potential and Zone 4 having the highest seismic potential. The Laguna Dam project area is located on the boundary between Zones 3 and 4.

Mineral Resources

Many of the alluvial floodplain areas along the Lower Colorado River are potential sources of sand and gravel aggregate. However, the deposits in the project area are not considered a potential source area of sand and gravel aggregate (USGS 1988).

3.13.2 Environmental Consequences and Mitigation Measures

3.13.2.1 Alternative 1 — Proposed Action

Environmental Consequences Although the proposed action is designed to remove accumulated sediments in the Laguna Reservoir, dredging and disposal activities could result in a slight short-term increase in suspended sediments in the Colorado River. Other activities, such as clearing vegetation, re-grading existing access roads, construction of a disposal pipeline, and soil stockpiling and spreading could similarly result in increased short-term soil erosion and associated sedimentation of the Colorado River. Although sediment accumulation as a result of the proposed action would be negligible in comparison to existing sediment build-up behind the dam, potential short-term erosion induced sedimentation would be considered nonpoint source pollution, which would be subject to the provisions of the CWA, as discussed in section 3.6.

Because the dam is not located in proximity to any active faults or in a highly seismic area, significant seismic impacts would not occur.

Mitigation Measures There are potentially significant impacts related to erosion during dredging and disposal operations. With implementation of the following mitigation measure, impacts related to erosion would be less than significant:

- Pursuant to NPDES requirements, a SWPPP shall be in place prior to road grading, pipeline construction, and disposal operations. The SWPPP shall include standard BMPs, including erosion control features such as straw wattles, silt fences, revegetation, minimization of grading (to the extent possible), construction of surface water velocity reducers, and installation of erosion control barriers around stockpiled soil. Such measures shall be implemented in accordance with an established erosion control plan.

The environmental consequences of implementation of habitat restoration under the LCR MSCP, including the specific wetlands restoration activities at the Imperial NWR, have been addressed in separate NEPA compliance documents, the LCR MSCP EIS (LCR MSCP 2004a) and the

Lower Colorado River National Wildlife Refuges Comprehensive Management Plan EA (USFWS 1994), respectively.

3.13.2.2 Alternative 2

Impacts would be similar, but slightly greater, than those described for Alternative 1, as more dredging and disposal operations would be required, thus extending the potential time that erosion induced siltation of the river could occur. Impacts would be less than significant with implementation of the mitigation measure provided for Alternative 1.

3.13.2.3 Alternative 3

Impacts would be similar to those described for Alternative 1, as the amount of dredging would be similar. Impacts would be less than significant with implementation of the mitigation measure provided for Alternative 1.

3.13.2.4 No-Action Alternative

No impacts would occur, as no construction and operation related erosion-induced siltation of the river would occur under the No-Action Alternative.

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4.0 Cumulative Impacts

4.1 Cumulative Impact Methodology

This section addresses the cumulative impacts of the proposed action in combination with other projects. The "proposed action" when used in this analysis refers to implementation of the Project described in Chapter 2. A list approach was used to identify projects that are closely related to the proposed action (i.e., either located within or in the vicinity of the planning area and having the potential to impact common resources) that could result in cumulatively considerable impacts. These projects then were examined for their potential to result in a cumulative impact when combined with the proposed action. Section 4.2 describes the projects included in the cumulative impact analysis, while section 4.3 summarizes cumulative impacts by each resource area.

4.2 Analysis of Cumulative Impacts

4.2.1 Future Activities Covered under the LCR MSCP

Changes in Points of Diversion of up to 1.574 maf per year of Colorado River Water

Covered activities include the potential changes in points of diversion of up to 1.574 maf per year of Colorado River water by water contractors in Arizona, California, and Nevada (LCR MSCP 2004a). Specific transfers for the entire 1.574 maf per year have not been identified; therefore, the impact analysis for the changes in points of diversion is programmatic. Diversion changes are expected to occur in response to shifts in water demand during the 50-year term of the Conservation Plan. It is anticipated that a shift in water diversion from the southern reaches of the Colorado River upstream to Lake Mead and to Lake Havasu will occur. Potential impacts could include changes in water surface elevation along the Lower Colorado River where points of diversion are changed as well as increased short and long-term fallowing. Potential impacts could include associated impacts on biological resources, short-term impacts to air quality, geology and soils/water quality, cultural resources, hazards and noise, and changes to socioeconomic resources (e.g. sales tax) and environmental justice issues (loss of agricultural jobs).

Yuma Area Water Resources Management Group Drainage Project

The Yuma Area Water Resource Management Group Drainage Project is a plan by Reclamation to achieve better control of groundwater levels in the Yuma area (LCR MSCP 2004a) by increasing total drainage pumping on the Yuma Mesa and in the Yuma Valley to reduce groundwater levels in the Yuma Valley to acceptable levels of 6 to 8 feet below the ground surface. The plan calls for increasing drainage pumping by about 40,000 to 50,000 af for 5

years, beginning in 2003. The drainage pumping will then be reduced to maintain those groundwater levels in the future. Of the total drainage pumping, some drainage will be discharged to the Colorado River above the Northerly International Border and some will be discharged into the Yuma Valley drainage system for delivery to Mexico at the Southerly International Border.

Repairs and Modifications to the Yuma Mesa Conduit (YMC) Drainage System

Repairs and Modifications to the Yuma Mesa Conduit (YMC) Drainage System on March 16, 2001 (Reclamation 2001). On September 7, 2003, an analysis entitled Effects on Riparian and Marsh Communities along the Colorado River Due to Water Table Reduction in the Yuma Valley was prepared to address the effects of the project (Reclamation 2003). The analysis concluded that the project would be implemented in highly disturbed areas and would not affect sensitive species or cultural resources or significantly affect other environmental resources. It also concluded that the project would help control groundwater levels in the Yuma Valley and improve the salinity of flows into Mexico at the Southerly International Border.

Ongoing Operations and Maintenance Activities at the Laguna Settling Basin

Several local water districts perform operation and maintenance activities on federally-owned facilities. The Colorado River Front Work and Levee Act (CRFWLSA) of 1927 and the Colorado River Floodway Protection Act (CRFPA) of 1986 address the protection of facilities from flood damage and cover operation and maintenance activities conducted by Reclamation. Some of the operation and maintenance activities include wash fan removal, bankline protection, levee location, dredging, jetty training structure location, drainage pump, channel outfalls, rip rap, roads, gauging stations, surveys, boat ramps, vegetation management, floodflow capacity, and settling basins (LCR MSCP 2004a).

4.2.2 Habitat Enhancement Projects

Mittry Lake Emergency Stabilization Projects

This project is an emergency stabilization and rehabilitation effort on approximately 475 acres of BLM-administered lands located within the Mittry Lake Wildlife Area, which is being undertaken in response to disturbance caused by the Mittry Lake Fire that occurred in March 2003. A Decision Record (BLM 2003a) for this project was signed in July 2003 by the BLM, and is supported with the Mittry Lake Emergency Stabilization and Rehabilitation EA (BLM 2003b) and Finding of No Significant Impact. The EA determined that the project would have limited impacts on recreational resources due to temporary restricted access to recreational areas. Additionally, beneficial impacts associated with the project were identified in the EA (BLM 2003b).

Mittry Lake Hazardous Fuels Reduction and Riparian Restoration

The BLM is proposing to restore riparian plant communities along the Lower Colorado River for the improvement of wildlife species diversity and numbers, to increase habitat complexity and reduce hazardous fuels in the area. Approximately 80 acres of land would be revegetated with native plants following removal of saltcedar at the south end of Mittry Lake. An EA was

completed for this project in December 2002 and determined that only minor impacts on air quality, aesthetics, and water quality would result from the Mittry Lake Hazardous Fuels Reduction and Riparian Restoration project.

Yuma East Wetlands Restoration Project

A Section 404 permit has been issued by the Corps of Engineers to the City of Yuma for the Yuma East Wetlands Restoration project, a 1,400-acre native riparian and river restoration project. A formal plan was completed in July of 2001 for the area by the Quechan Indian Nation, the City of Yuma, and the Yuma Crossing National Heritage Area acting as the lead entities. The project is scheduled to be completed, depending on funding, between 2008-2013. The project could result in the conversion of approximately 400 acres of agricultural land to native vegetation and would have construction-related impacts on air quality. No determination has been made whether the agricultural land that would be converted to wetlands is important farmland.

Cocopah Tribe River Restoration Project

The Cocopah Tribe River Restoration Project is currently in the conceptual phase and therefore does not have a well-defined project description. The project would involve saltcedar eradication and replanting with honey mesquite and cottonwood-willow. It is anticipated that this restoration project would have long-term beneficial impacts on aesthetics and biological resources. Vegetation removal and replanting activities would likely result in impacts on aesthetics, biological resources, air quality, hydrology, geology and soils, cultural resources, and noise.

4.2.3 Other Projects

All-American Canal Lining Project

Imperial Irrigation District obtains water from the 82-mile long All-American Canal, which diverts water from the Colorado River at Imperial Dam. The lining of the All-American Canal was authorized by Title II of Public Law 100-675, dated November 17, 1988 and in accordance with the terms of the Allocation Agreement. This Act authorizes the Secretary to construct a new lined canal or to line the previously unlined portions of the All-American Canal to reduce seepage of water. Reclamation prepared a Final EIS/EIR for the All-American Canal Lining Project in March 1994 (Reclamation and IID 1994). Environmental impacts were identified in the following areas: groundwater, groundwater quality and quantity in Mexico, biological resources (wetlands including wetlands along the canal and along the impacted reach of the Colorado River, terrestrial plant communities and associated wildlife, and special status species), canal fisheries, air quality, cultural resources, hydroelectric power, and recreation (Reclamation and IID 1994). However, mitigation measures have been incorporated to address the level of impacts of this project (Reclamation and IID, 1994).

Lower Colorado River Boundary and Capacity Preservation Project

The Lower Colorado River Boundary and Capacity Preservation Project is proposed by the International Boundary and Water Commission, U.S. Section (USIBWC). The project is located along the Limitrophe Division of the Colorado River, the 23.7 mile “international segment” of

the Colorado River. This portion of the river serves as the border between the U.S. (State of Arizona) and Mexico (State of Baja California del Norte). The project would include measures to preserve and stabilize the international boundary and improve flood control of the channel, as well as long-term operations and maintenance activities. The environmental impacts of the project may include loss of vegetation and associated wildlife habitat between the river levees as a result of clearing for the pilot channel. The extent of that impact will depend on the actual route of the channel, which is now being developed. Since the project would include a significant amount of construction, construction-related impacts on aesthetics, air quality, hazards, geology and soils, and water quality could occur.

Drop 2 Reservoir Project

The Drop 2 Reservoir Project has four primary physical components, the reservoir itself (which maybe composed of two 4,000 af capacity "cells", occupying 460 acres on a 615 acre site), an inlet canal (seven miles in length, 19 feet wide with capacity flow of 1,800 cfs), and an outlet canal (approximately 3,500 feet in length). Project operations would be relatively simple: a new inlet canal would convey water from the existing Coachella Canal Turnout to a new storage reservoir, and later, water would be returned to the All-American Canal at a point approximately one mile downstream of Drop 2, via a new outlet canal. Both the inlet and outlet canals would be designed to use gravity flow. To maintain capacity, periodically silt would have to be removed from the bottom of the reservoir. The Draft EA for the Drop 2 Project is expected to be released in July 2006. Impacts have not yet been identified for this project.

4.3 Impacts by Resource

4.3.1 Aesthetics

The proposed action would not result in the obstruction or degradation of any scenic viewshed. Construction may cause temporary changes in the visual character of the project area, but would not result in a significant impact. Rather, the addition of a new open waterway would be considered beneficial. Operations would not cause the overall nature of the project area to be degraded and would not result in impacts to visual quality. Therefore, the proposed action, in conjunction with other proposed or on-going activities described in section 4.2, would result in no significant adverse cumulative impacts to aesthetics resources and may result in beneficial cumulative impacts in the project vicinity.

4.3.2 Air Quality

Implementation of the proposed action and other reasonably foreseeable actions described in section 4.2 may result in increased area emissions associated with construction activities. Due to the mobile nature and short duration of most emission sources, project emissions in combination with future emission sources would not be expected to contribute to an exceedance of an ambient air quality standard. As a result, the proposed action, in combination with other foreseeable projects, would not produce significant cumulative impacts to air quality.

4.3.3 Biological Resources

The proposed action and the projects described in section 4.2.1 are covered activities under the LCR MSCP and as such the biological impacts of these projects are mitigated through the protection, enhancement, and creation of habitat along the Lower Colorado River as a requirement of implementation of the LCR MSCP. The LCR MSCP and the habitat enhancement projects identified in section 4.2.2 would result in beneficial effects on vegetation and habitat. There are potentially significant adverse biological impacts from the proposed action resulting from the loss of habitat for sensitive and common wildlife species; however, mitigation of the effects of the proposed action is provided through avoidance and minimization measures designed into the proposed action and through implementation of the LCR MSCP, including the marsh and open water creation at Imperial NWR. With the implementation of avoidance and minimization measures under the proposed action and conservation measures under the LCR MSCP, the level of impact would be reduced to adverse but less than significant. Because the proposed action and other projects covered under the LCR MSCP are address by the LCR MSCP, significant cumulative impacts on biological resources are not expected to occur.

4.3.4 Cultural Resources

The proposed action would not result in disturbance of known historic properties, including archeological resources and historic architectural resources. No significant cultural resources impacts were identified for the proposed action. During the construction of projects identified in section 4.2, there is potential for unforeseen cultural resources to be discovered or damaged. However, with mitigation measures to ensure proper actions are taken if cultural resources are discovered during construction, impacts would be expected to be less than significant. Therefore, the proposed action, in conjunction with other projects listed in section 4.2, would not result in significant cumulative impacts on cultural resources.

4.3.5 Environmental Justice

No significant impacts were identified for the proposed action that would adversely affect human populations or the public. The proposed action, therefore, would not result in disproportionately high and adverse human health and environmental effects on minority or low-income populations. The environmental documentation for one or more of the other cumulative projects described in section 4.2 identifies environmental justice effects; however, the types of disproportionate effects identified (e.g., reductions in agricultural employment, increased noise, and fugitive dust) would not occur for the proposed action and the disproportionate effects of the other projects would be localized. The proposed action, in combination with other proposed or on-going projects, would not cause disproportionate cumulative effects on minority or low-income populations.

4.3.6 Hazards/Hazardous Materials

The project site is not located in close proximity to any known or suspected hazardous waste or petroleum waste sites. However, incidental spills of petroleum products could occur during dredging activities, and such spills could result in significant impacts to sediment and water quality. With the implementation of mitigation measures, these risks of incidental spills would be reduced to less than significant. Other projects described in section 4.2 have similar

hazards/hazardous materials related impacts due to construction activities. However, with anticipated mitigation measures, these risks would be cumulatively less than significant as these impacts are localized and temporary.

4.3.7 Hydrology/Water Quality

Impacts from the proposed action related to hydrology include changes to reservoir elevations, temporary and localized impacts on water quality during dredging, as well as potential decreases in hydroelectric power generation. The proposed action would have beneficial impacts related to greater ability to run sluicing flows between Imperial and Laguna Dams and increased flexibility in making water deliveries to Mexico. Cumulative projects described in section 4.2 that also involve dredging activities would result in similar minimal impacts. Any resulting changes from cumulative projects in water deliveries from Laguna Dam to Morelos Dam would be minimal and changes to hydroelectric power production would be minimal. Thus, the net cumulative change to hydroelectric power generation is anticipated to be less than significant. The proposed action, in conjunction with other proposed or on-going projects described in section 4.2, would not result in cumulatively significant impacts.

4.3.8 Indian Trust Assets

There are no ITAs or other resources of tribal concern in the project area, and significant impacts on ITAs or other tribal resources from implementation of the proposed action would not occur. Therefore, the proposed action, in combination with other proposed or on-going projects, would not cause disproportionate cumulative effects on ITAs.

4.3.9 Land Use

Development of the proposed action would not lead to any incompatible land uses, disrupt any established land configurations, or violate any land use standards and guidelines from local and regional plans. Implementation of the proposed action, in conjunction with other proposed and on-going projects listed in section 4.2, would not be expected to cause cumulatively significant impacts on land use.

Additionally, construction activities for the proposed action would not conflict with agricultural operations on lands north of Laguna Dam currently in agricultural production. The project area and surrounding lands are federally-owned lands that are managed by Reclamation and not used for agricultural purposes. As dredging activities would not affect agriculturally prime soils and/or regionally unique agricultural resources, significant impacts would not occur. Implementation of the proposed action, in conjunction with other proposed and on-going projects listed in section 4.2, would not be expected to cause cumulatively significant impacts on agriculture.

4.3.10 Noise

The proposed action would require standard dredging activities, including vegetation removal, launch ramp construction, access road maintenance, and periodic maintenance dredging. Other projects described in section 4.2 would have similar temporary construction noise. It is not expected that these projects in combination with the proposed action would lead to significant cumulative impacts to any sensitive noise receptors.

4.3.11 Public Resources

With implementation of the proposed action, project dredging activities would not substantially preclude access to existing passive recreational opportunities, and, therefore, significant impacts to recreation would not occur. In addition, increasing storage behind Laguna Dam would increase the available reservoir area accessible to the public, which would result in increased opportunities for fishing, hunting, bird watching, and other recreational activities adjacent to the reservoir. These long-term beneficial impacts from the proposed action, combined with other foreseeable projects discussed in section 4.2, would not be expected to cause any cumulatively significant impacts on recreation.

Implementation of the proposed action would result in an irreversible commitment of fuel for construction vehicles and equipment, human labor and other resources. Energy (electricity and natural gas) and water consumption, as well as demand for services, would not increase as a result of the implementation of the proposed action. These commitments of resources for the proposed action and other reasonably foreseeable projects are neither unusual nor unexpected given the nature of the action; therefore, no significant cumulative impact on energy or depletable resources is expected.

4.3.12 Socioeconomics

The proposed action would have negligible effects on population, housing, and other socioeconomic issues. The proposed action would not displace persons or housing, nor would it induce substantial population growth in the area, either directly or indirectly. The proposed action, in combination with other foreseeable projects described in section 4.2, is not expected to have a cumulatively significant impact on socioeconomics.

4.3.13 Topography, Geology, Soils, and Mineral Resources

Activities associated with the proposed action such as clearing vegetation, re-grading existing access roads, construction of a disposal pipeline, soil stockpiling and spreading, and maintenance activities could result in some increased soil erosion and associated sedimentation of the Colorado River. The proposed action would not increase the seismic risk to the dam, and significant seismic impacts would not occur. Mineral resources are not expected to occur in the project area, so no impact would occur. Other cumulative projects described in section 4.2 will have similar impacts to soils and geology during construction phases; however, since these impacts are localized and temporary, cumulative impacts on topography, geology, soils, and mineral resources would not be expected.

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5.0 Other NEPA Considerations

5.1 Possible Conflicts between the Proposed Action and the Objectives of Federal, State, Local, and Regional Land Use Plans, Policies, and Controls

Implementation of the proposed action would comply with existing federal regulations and state, regional, and local policies and programs. The federal acts, executive orders, policies, and plans that apply include the following: NEPA; CAA and Federal General Conformity Rule; CWA; ESA; Fish and Wildlife Coordination Act, NHPA; Rivers and Harbors Act; EO 12898, Minority Populations and Low-Income Populations; and EO 12372, Coordination with State and Regional Agencies. Other state, local, and regional plans, policies, and controls addressed below include the following: California ESA, ADEQ Rules and Regulations, and ICAPCD Rules and Regulations.

5.1.1 Federal Acts, Executive Orders, Policies, and Plans

National Environmental Policy Act

This EA was prepared in accordance with the NEPA, 42 U.S.C. §§ 4321-4370d, as implemented by the CEQ Regulations, 40 CFR Parts 1500-1508. Executive Order 11991 of 24 May 1977 directed the CEQ to issue regulations for procedural provisions of NEPA; these are binding for all federal agencies.

Clean Air Act and General Conformity Rule

The CAA and subsequent amendments specify regulations for control of the nation's air quality. Federal and state ambient air standards have been established for each criteria pollutant. The 1990 amendments to the CAA require federal facility compliance with all applicable substantive and administrative requirements for air pollution control. The air quality analysis shows that the proposed action would not contribute to an exceedance of an ambient air quality standard (see section 3.2 – Air Quality). The CAA also requires federal actions to conform to the goals of the applicable SIP. Reclamation has determined that this proposed action would conform to the SIP.

Clean Water Act

Section 404 of the CWA and subsequent amendments established a program to regulate the discharge of dredged and fill material into waters of the U.S., including wetlands. Activities in waters of the U.S. that are regulated under this program include fills for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and conversion of wetlands to uplands for farming and forestry. The proposed action would involve the placement of dredge material into waters of the U.S., including wetlands, as

an inadvertent result of dredging activities within these waters. The proposed action would require a section 404 permit from USACE for the placement, though inadvertent, of dredged material into waters of the U.S. The application process under section 404 CWA will be conducted by Reclamation.

Endangered Species Act

The ESA of 1973 and subsequent amendments provide for the protection of threatened and endangered species of fish, wildlife, and plants and their habitats. The Act requires federal agencies to ensure that no agency action is likely to jeopardize the continued existence of endangered or threatened species or destroy or adversely modify designated critical habitat. The proposed action is a covered activity under the LCR MSCP, a program to enhance wildlife habitats along the Lower Colorado River that has been approved and authorized by Federal, state, tribal, and local agencies, including USFWS and Reclamation. All federally listed species known to occur in the LCR MSCP planning area were included under the LCR MSCP (covered species), and all impacts associated with the proposed action and other covered actions were evaluated under a Biological Assessment and subsequent Biological and Conference Opinion (USFWS 2005), which determined that the program is not likely to jeopardize the continued existence of endangered or threatened species nor destroy or adversely modify designated critical habitat (see section 3.3 – Biological Resources for more details).

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act and subsequent amendments provides that whenever the waters or channel of a body of water are modified by a department or agency of the U.S., the department or agency first shall coordinate with the USFWS and with the head of the agency exercising administration over the wildlife resources of the state where construction will occur, with a view to the conservation of wildlife resources. The Act provides that land, water and interests may be acquired by federal construction agencies for wildlife conservation and development. In addition, real property under jurisdiction or control of a Federal agency and no longer required by that agency can be utilized for wildlife conservation by the state agency exercising administration over wildlife resources upon that property. Reclamation has and continues to coordinate with both Federal and State Wildlife agencies on the proposed action, including U.S. Fish and Wildlife Service and Arizona Game and Fish Department.

National Historic Preservation Act

The NHPA provides for the protection, enhancement, and preservation of those properties that possess significant architectural, archaeological, historical, or cultural characteristics. Section 106 of the NHPA requires the head of any federal agency having direct or indirect jurisdiction over a proposed federal or federally financed undertaking, prior to the expenditure of any federal funds on the undertaking, to take into account the effect of the undertaking on any historic property. The proposed action would have no adverse effect on any historic property, including archeological resources, historic architectural resources, or traditional cultural resources (see section 3.4 – Cultural Resources). In letters dated 6 January 2006 and 14 December 2005 (see Appendix C), respectively, the SHPOs of California and Arizona concurred with a no historic properties affected finding under 36 CFR 800.4 (d)(1) for the proposed action.

Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899 (33 USC 401, et seq.) requires Congressional approval for the building of any wharf, pier, jetty, and other structures in navigable waters. Navigable waters include all water bodies that are presently, have historically, or could in the future be used for navigation for the purpose of interstate or foreign commerce. Section 10 also requires the approval from the U.S. Army Corps of Engineers (USACE) for any excavation or fill within navigable waters. The Rivers and Harbors Act covers construction, excavation, or deposition of materials in, over, or under navigable waters. Activities such as dredging, disposing of dredged materials, excavating, filling, or construction of structures in navigable waters require a Section 10 permit from USACE. The proposed action involves dredging within a navigable water of the U.S. (the Colorado River) and as such would require authorization from USACE under section 10 of the Rivers and Harbors Act. Such compliance is done in conjunction with compliance with section 404 of the Clean Water Act, see above.

Executive Order 12898

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, directs all federal departments and agencies to incorporate environmental justice considerations in achieving their mission. Each federal department or agency must identify and address disproportionately high and adverse human health or environmental effects of federal programs, policies, and activities on minority populations and low-income populations. The proposed action would not disproportionately affect any minority populations or low-income populations (see section 3.5 – Environmental Justice).

Executive Order 12372

Executive Order 12372, Intergovernmental Review of Federal Programs, was issued in 1982 in order to foster an intergovernmental partnership and a strengthened federalism by relying on State and local processes for the State and local government coordination and review of proposed Federal Financial assistance and direct Federal development. Reclamation pursues close and harmonious planning relations with local and regional agencies and planning commissions of adjacent cities, counties, and states. In preparing this EA, relevant data from state, regional, and local agencies was reviewed in order to determine regional and local conditions associated with the proposed action. With respect to the proposed action, no mutual land use or environmental issues require resolution.

5.1.2 State, Local, and Regional Plans, Policies, and Controls

California Endangered Species Act

The California ESA does not apply on strictly federal lands or to federal actions. However, MSCP-listed species, which includes some state-listed species, are addressed in this document. The proposed action is a covered action under the LCR MSCP, a program to enhance wildlife habitats along the Lower Colorado River. All California state-listed species known to occur

along the LCR MSCP planning area were included under the program (covered species) (see section 3.3 – Biological Resources for more details).

ADEQ Rules and Regulations and ICAPCD Rules and Regulations

Proposed action air emissions would comply with all applicable ADEQ Rules and Regulations and ICAPCD Rules and Regulations (see section 3.2 – Air Quality for more details).

5.2 Relationship between Local Short-Term Use of the Human Environment and Maintenance and Enhancement of Long-Term Biological Productivity

NEPA requires consideration of the relationship between short-term use of the environment and the impacts that such use could have on the maintenance and enhancement of long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. Such impacts include the possibility that choosing one development option could reduce future flexibility to pursue other options, or that choosing a certain use could eliminate the possibility of other uses at the site.

Implementation of the proposed action would not result in any such environmental impacts because it would not pose long-term risks to health, safety, or the general welfare of the communities surrounding the project area that would significantly narrow the range of future beneficial uses.

5.3 Any Probable Adverse Environmental Effects that Cannot be Avoided and are not Amenable to Mitigation

This EA has determined that the proposed action would not result in any significant unmitigable impacts; therefore, there are no probable adverse environmental effects that cannot be avoided or are not amenable to mitigation.

6.0 List of Preparers

Lead Agency

Unites States Bureau of Reclamation
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This EA was prepared for, and under the direction of, Reclamation by Science Applications International Corporation (SAIC). Members of SAIC's professional staff who contributed to the preparation of this document are listed below.

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7.0 Persons and Agencies Contacted or Consulted

The following agencies, organizations, and individuals were contacted during preparation of this EA:

- Arizona Game and Fish Department
- Arizona State Historic Preservation Office
- California Department of Fish and Game
- California State Historic Preservation Office
- Fort Yuma Indian Reservation
- U.S. Army Corps of Engineers
- U.S. Bureau of Indian Affairs
- U.S. Bureau of Land Management
- U.S. Fish and Wildlife Service

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9.0 References

Abeyta, D. 1999. Cultural Resources Survey for the Imperial Dredging and Sediment Disposal Project, Imperial County, California and Yuma County, Arizona. Letter from the California Office of Historic Preservation to Sylvia Ferrier, Chief, Technical Services Division, Reclamation, Yuma Area Office, May 18, 1999.

Anderson, B.W., and R.D. Ohmart. 1984a. Lower Colorado River riparian methods of quantifying vegetation communities to prepare type maps. Final report. Boulder City, NV: U.S. Bureau of Reclamation, Lower Colorado Region.

Anderson, B.W., and R.D. Ohmart. 1984b. A vegetation management study for the enhancement of wildlife along the lower Colorado River. Final report. Boulder City, NV: Bureau of Reclamation, Lower Colorado Region.

Arizona Department of Environmental Quality. 2005. Arizona Administrative Code Table of Contents. Web site http://www.azsos.gov/public_services/Table_of_Contents.htm.

Arizona Game and Fish Department. 2005. Fish counts and locations for southwestern Arizona. http://www.gf.state.az.us/h_f/where_fish_southwest.shtml. Accessed February 8, 2006.

Arizona Geological Survey (AGS). 2000. Geologic Map of Arizona, Map 35. Compiled by S.M. Richard, S.J. Reynolds, J.E. Spencer, and P.A. Pearthree, scale 1:1,000,000.

Biever, Mike. 2006. Personal communication, Bureau of Reclamation, Yuma Area Office, Yuma, Arizona.

Brown, B.T. 1988. Monitoring bird population densities along the Colorado River in Grand Canyon: 1987 breeding season. (NTIS #PB88-183504/AS.) U.S. Department of Commerce, National Technical Information Service.

Brown, D.E. (ed.). 1994. *Biotic communities: Southwestern United States and northwestern Mexico*. Salt Lake City, UT: University of Utah Press.

Brown and Caldwell. 2006. Comparison of Laguna Reservoir Inflow, Outflow, and Water Storage Elevations under 1982 and 2003 Reservoir Conditions. March.

Brown and Caldwell. 2005. *Technical Memorandum: Comparison of Laguna Reservoir Inflow, Outflow, and Water Surface Elevations Under 1982 and 2003 Reservoir Conditions*. December.

Bureau of Economic Analysis. 2003. Full-time and Part-time Employment by Industry, tables for Imperial County, California; Yuma County, Arizona.

Bureau of Land Management (BLM). 2003a. Decision Record for Mittry Lake Emergency Stabilization. Yuma Field Office. July.

Bureau of Land Management (BLM). 2003b. Environmental Assessment for Mittry Lake Emergency Stabilization and Rehabilitation. Yuma Field Office. July.

Bureau of Land Management (BLM). 2005a. Reclamation's Draft NEPA Handbook. 2005.

Busch, D.E., and S.D. Smith. 1995. Mechanisms associated with decline of woody species in riparian ecosystems of the southwestern U.S. *Ecological Monographs* 65(3):347–370.

California Department of Fish and Game Natural Diversity Database. 2005. Rarefind. Wildlife and Habitat Data Analysis Branch Commercial Division.

California Department of Transportation (Caltrans). 1963. California Scenic Highways Program. Webpage: http://www.dot.ca.gov/hq/LandArch/scenic/cahisys.htm. Accessed November 2005.

California Division of Mines and Geology (CDMG). 1977. Geologic Map of California. Compiled by C.W. Jennings, scale 1:750,000.

California Air Resources Board (ARB). 1989. *California Surface Wind Climatology*. Meteorology Section, Modeling and Meteorology Branch, Technical Support Division.

California Air Resources Board (ARB). 1999. OFFROAD Emissions Model. Web site http://www.arb.ca.gov/msei/msei.htm.

Council on Environmental Quality (CEQ). 1997. Environmental Justice Guidance under the National Environmental Policy Act.

DeLoach, C.J., R.I. Carruthers, J.E. Lovich, T.L. Dudley, and S.D. Smith. 2000. Ecological Interactions in the Biological Control of Saltcedar (Tamarix spp.) In the United States: Toward a New Understanding. Pages 819–873 in N.R. Spencer (ed.), *Proceedings of the X International Symposium on Biological Control of Weeds*. Available at: http://www.werc.usgs.gov/cc/weed.htm.

Eddleman, W.R. 1989. Biology of the Yuma Clapper Rail in the Southwestern U.S. and Northwestern Mexico. Final Report to U.S. Bureau of Reclamation (Yuma Projects Office). Inter-Agency Agreement No. 4-AA-30-02060. 125 pp.

Environmental Data Resources (EDR), Inc. 2002. The EDR Radius Map Report, Laguna Dam, Winterhaven, CA 92283, Inquiry Number: 893713.1s, December 6.

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Federal Interagency Committee on Urban Noise. 1980. Guidelines for Considering Noise in Land Use Planning and Control. June.

Garvey, K. 2005. Personal communication via e-mail. Natural Resource Specialist, Bureau of Reclamation, Yuma Area Office, Yuma, Arizona.

Hinojosa-Huerta, O., S. DeStephano, and W.W. Shaw. 2000. Abundance, distribution, and habitat use of the Yuma clapper rail (Rallus longirostris yumanensis) in the Colorado River Delta, Mexico. Final Report. Arizona Cooperative Fish and Wildlife Research Unit, University of Arizona., Tucson. 78 pp.

Hinojosa-Huerta, O., S. DeStephano, and W.W. Shaw. 2001. Distribution and abundance of the Yuma clapper rail (Rallus longirostris yumanensis) in the Colorado River delta, Mexico. *Journal of Arid Environments* (2001) 49: 171-182.

Hinojosa-Huerta, O., S. DeStephano, and W.W. Shaw. 2003. H. Iturribarria-Rojas, and E. Zamora-Hernandez. Status of the Yuma Clapper Rails and California Black Rail in the Colorado River Delta. Report to Sonoran Joint Venture. Pronatura Sonora, San Luis Rio Colorado, Sonora, Mexico.

Holland, R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. Sacramento, CA: California Department of Fish and Game.

Imperial County Air Pollution Control District (ICAPCD). 2005. CEQA Air Quality Handbook. February 2005.

Imperial County, Planning/Building Department. 1993a. Imperial County General Plan.

Imperial County, Planning/Building Department. 1993b. Imperial County Land Use Element.

Imperial National Wildlife Refuge. *Preconstruction Notification, Imperial Ponds Reconstruction and Expansion, Imperial National Wildlife Refuge, Arizona.* Memorandum to U.S. Army Corps of Engineers Regulatory Section, Arizona Branch, Tucson, AZ. March 9, 2006.

Jennings, C.W. 1994. Fault Activity Map of California and Adjacent Areas, with Locations and Ages of Recent Volcanic Eruptions. California Division of Mines and Geology, Geology Data Map No. 6, Scale 1:750,000.

Koronkiewicz, T.J., M.A. McLeod, B.T. Brown, and S.W. Carothers. 2004. Southwestern Willow Flycatcher surveys, demography, and ecology along the lowere Colorado River and tributaries, 2003. Annual report submitted to U.S. Bureau of Reclamation, Boulder City, NV by SWCA Environmental Consultants, Flagstaff, AZ. 125pp.

Lovich, J.E. 2000. Tamarix Ramosissima Lebed, Tamarix Chinensis, Tamarix Gallica, Tamarix Parviflora. Pages 312–317 in C.C. Bossard, J.M. Randall, and M.C. Hoshovsky (eds.), *Invasive Plants of California's Wildlands.* Berkeley, CA: University of California Press.

Lower Colorado River Multi-Species Conservation Program (LCR MSCP). 2004a. Lower Colorado River Multi-Species Conservation Program, Volume I: Programmatic Environmental Impact Statement/Environmental Impact Report. December 17. Sacramento, CA.

Lower Colorado River Multi-Species Conservation Program (LCR MSCP). 2004b. Lower Colorado River Multi-Species Conservation Program, Volume II: Habitat Conservation Plan. Final. December 17. (J&S 00450.00.) Sacramento, CA.

Lower Colorado River Multi-Species Conservation Program (LCR MSCP). 2004c. Lower Colorado River Multi-Species Conservation Program, Volume III: Biological Assessment. April 14. (J&S 00-450.) Sacramento, CA.

McKernan, R.L., and G. Braden. 2002. Status, Distribution, and Habitat Affinities of the Southwestern Willow Flycatcher along the Lower Colorado River: Year 6 – 2001. May. Prepared for U.S. Bureau of Reclamation, Lower Colorado River Region, Boulder City, NV and U.S. Fish and Wildlife Service, Carlsbad Field Office, Carlsbad, CA, and Reno Office, Reno, NV.

McMinn, H.E. 1939. *An illustrated manual of California shrubs*. Berkeley, CA: University of California Press.

Ohmart, RD., BW. Anderson, and W.C. Hunter. 1988. The ecology of the lower Colorado River from Davis Dam to the Mexico-United States international boundary: A community profile. (Biological Report 85[7.19].) U.S. Fish and Wildlife Service.

Parsons, R.B., R.C. Herriman, and T.D. Cook. 1986. Geomorphic Surfaces and Soils, Colorado River Area, Arizona and California, Technical Monograph. U.S. Department of Agriculture, Soil Conservation Service. October.

Petersen, M., D. Beeby, W. Bryant, C. Cao, C. Cramer, J. Davis, M. Reichle, G. Saucedo, S. Tan, G. Taylor, T. Toppozada, J. Treiman, and C. Wills. 1999. Seismic Shaking Hazard Maps of California. California Division of Mines and Geology, Map Sheet 48.

Pfaff, C., R.L. Queen, and D. Clark. 1999. The Historic Yuma Project: History, Resources Overview. Prepared for the Lower Colorado Region, Boulder City, Nevada and Yuma Area Office, Yuma, Arizona, 1992 (Revised 1999).

Rowlands, P.G., J. Willoughby, and C. Rutherford. 1995. Floristics of the California Desert Conservation Area. Pages 213–270 in J. Latting and P. G. Rowlands (eds.), *The California Desert: An Introduction to Natural Resources and Man's Impact*, Volume I. Riverside, CA: University of California, Riverside Press.

Sawyer, J.O., and T. Keeler-Wolf. 1995. *A manual of California vegetation*. Sacramento, CA: California Native Plant Society.

Sogge, M.K., and R.M. Marshall. 2000. A survey of current breeding habitats. In Status, ecology, and conservation of the southwestern willow flycatcher. General Technical Report RMRSGTR-60 (D. M. Finch, and S. H. Stoleson eds). U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ogden, Utah.

Stromberg, J.C., D.T. Patten, and B.D. Richter. 1991. Flood flows and dynamics of Sonoran riparian forests. *Rivers* 2(3):221–235.

SWCA Environmental Consultants. 2004. Southwestern Willow Flycatcher Surveys, Demography, and Ecology Along The Lower Colorado River and Tributaries, 2003. March, 2004.

SWCA Environmental Consultants. 2002. U.S. Army Corps of Engineers and U.S. Department of the Interior, Bureau of Reclamation. Preliminary Delineation of Ordinary High Water Mark and Jurisdictional Wetlands at the Proposed Laguna Reservoir Storage Restoration Project Site. November, 2002.

Tickes, Barry, M. Zerkoune, and B. Bequette. 2002. Yuma County Agricultural Statistics. The University of Arizona, Cooperative Extension. Information based on Arizona Crop & Livestock Reporting Service.

Todd, R.L. 1986. A Saltwater Marsh Hen in Arizona. A history of the Yuma clapper rail (Rallus longirostris yumanensis). Federal Aid Project W-95-R. Arizona Game and Fish Department, Phoenix. 290 pp.

Turner, R.M., and M.M. Karpiscak. 1980. Recent vegetational changes along the Colorado River between Glen Canyon Dam and Lake Mead, Arizona. U.S. Geological Survey Professional Paper 1132.

United States Bureau of Reclamation (Reclamation). 1999. A Class II Cultural Resources Survey for the Imperial Dredging and Sediment Disposal Project, Imperial County, California and Yuma County Arizona. Bureau of Reclamation, Yuma Area Office, Yuma, Arizona.

United States Bureau of Reclamation (Reclamation). 2001. Categorical Exemption for Repairs and Modifications to the Yuma Mesa Conduit (YMC) Drainage System.

United States Bureau of Reclamation (Reclamation). 2002. Final Environmental Impact Statement for Implementation Agreement, Inadvertent Overrun and Payback Policy, and Related Federal Actions.

United States Bureau of Reclamation (Reclamation). 2003. Supplemental Analysis for Categorical Exemption for Effects on Riparian and Marsh Communities along the Colorado River Due to Water Table Reduction in the Yuma Valley.

United States Bureau of Reclamation (Reclamation). 2004. Final Draft, Preliminary Study of Lower Colorado River Storage Alternatives, October 15.

United States Bureau of Reclamation (Reclamation). 2005a. Reclamation's Draft NEPA Handbook.

United States Bureau of Reclamation (Reclamation). 2005b. Scoping Summary Report, Laguna Restoration Project Imperial County, California.

United States Bureau of Reclamation (Reclamation). 2005c. A Cultural Resources Inventory and Evaluation for the Laguna Dam Restoration Project, Imperial County, California, and Yuma County, Arizona. Prepared by ASM for the Yuma Area Office of Reclamation.

United States Bureau of Reclamation (Reclamation). 2005d. Geographical Information System Database for Lower Colorado River.

United States Bureau of Reclamation (Reclamation). 2005e. Boulder Canyon Project. All American Canal System. Website. www.usbr.gov/dataweb/html/allamcanal.html. Accessed November 16, 2005.

United States Bureau of Reclamation (Reclamation). 2005f. Dredging equipment activity data in Excel spreadsheet format.

United States Bureau of Reclamation (Reclamation). 2005g. *Imperial National Wildlife Refuge, Imperial Native Fish Habitat Reconstruction Design Workshop.* Final Report. July 11, 2005. Boulder City, NV. 36 pp.

United States Bureau of Reclamation and Imperial Irrigation District (Reclamation and IID). 1994. Final EIS/EIR for the All-American Canal Lining Project. March.

United States Census Bureau. 2000. Detailed Tables. American FactFinder. Census 2000 Summary File 1 (SF 1). www.factfinder.census.gov.

United States Department of Agriculture (USDA). 1974. Soil Survey of Palo Verde Area, California. Soil Conservation Service.

United States Department of Agriculture (USDA). 1975. Arizona General Soil Map. Soil Conservation Service.

United States Department of Agriculture (USDA). 1986. Soil Survey of Colorado River Indian Reservation, Arizona, California. Soil Conservation Service.

United States Department of Agriculture (USDA). 2002. Census of Agriculture. National Agricultural Statistics Service.

United States Department of Agriculture (USDA). 2003. Table of prime agricultural soils in Arizona sent to SAIC via email by Phil Camp.

United States Department of Agriculture (USDA). Undated. Arizona General Soil Map.

United States Department of Housing and Urban Development. 1985. *The Noise Guidebook.* Washington, D.C.: General Printing Office.

United States Environmental Protection Act (USEPA). 1995 and 1996. AP-42, sections 3.3 and 11.2.3.

United States Fish and Wildlife Service. 1983. Yuma clapper rail recovery plan. Albuquerque, NM.

United States Fish and Wildlife Service. 1994. Lower Colorado River National Wildlife Refuge Comprehensive Management Plan 1994 – 2014. Final Environmental Impact Assessment. Albuquerque, NM.

United States Fish and Wildlife Service. 1995. Endangered and threatened wildlife and plants; final rule determining endangered status for the southwestern willow flycatcher: Southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and extreme northwestern Mexico. February 27. *Federal Register* 60(38):10694–10714.

United States Fish and Wildlife Service. 2005. Biological and Conference Opinion on the Lower Colorado River Multi-Species Conservation Program, Arizona, California, and Nevada. Phoenix, AZ.

U.S. Geological Survey (USGS). 1988. *Natural Aggregates of the Conterminous United States.* USGS Bulletin 1594. Prepared by Langer, W.H.

Unitt, P. 1984. The Birds of San Diego County. Memoir 13, San Diego Society of Natural History. 276 pp.

Unitt, P. 1987. *Empidonax traillii extimus*; An endangered subspecies. *Western Birds* 18:137-162.

Water Education Foundation 2001. Layperson's guide to the Colorado River. Updated 2001. Sacramento, CA. Cited in: Lower Colorado River Multi-Species Conservation Program. 2004. Final Habitat Conservation Plan. December.

Yuma County Department of Development Services. 2001. Yuma County 2020 Comprehensive Plan. Website: http://www.co.yuma.az.us/dds/ord/2010/main.htm. Accessed November 9, 2005.

Zeiner, D.C., W.F. Laudenslayer Jr., K.E. Mayer, and M. White (eds.). 1990. *California's wildlife. Volume III: Mammals.* Sacramento, CA: California Department of Fish and Game.

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10.0 Acronyms

ADEQ	Arizona Department of Environmental Quality
af	acre-feet
AMM	Avoidance and Minimization Measures
ARB	California Air Resources Board
AGS	Arizona Geological Survey
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	Best Management Practice
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Caltrans	California Department of Transportation
CCR	California Code of Regulations
CDMG	California Division of Mines and Geology
CDOC	California Department of Conservation
CEQ	Council on Environmental Quality
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CRFWLSA	Colorado River Front Work and Levee Act

CRFPA	Colorado River Floodway Protection Act
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
EA	Environmental Assessment
ECM	Environmental Compliance Memorandum
EDR	Environmental Data Resources
EO	Executive Order
ESA	Endangered Species Act
FWCA	Fish and Wildlife Coordination Act
ICAPCD	Imperial County Air Pollution Control District
ITA	Indian Trust Asset
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
L_{dn}	Day/Night Average Sound Level
L_{eq}	equivalent sound level
maf	million acre-feet
MBTA	Migratory Bird Treaty Act
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_x	nitrogen oxides
NPDES	National Pollution Discharge Elimination System
NRHP	National Register of Historic Places
O_3	Ozone
PM_{10}	particulate matter less than 10 microns in diameter

ppm	parts per million
Reclamation	United States Bureau of Reclamation
RMP	Resource Management Plan
ROI	Region of Influence
S-24	State Highway 24
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	sulfur dioxide
SWPPP	Storm Water Pollution Prevention Plan
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USIBWC	International Boundary and Water Commission, United States Section
UST	underground storage tank
VOC	volatile organic compound
YMC	Yuma Mesa Conduit
µg/m3	micrograms per cubic meter

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